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[ORIGINAL COMMUNICATION.]

SYRUP OF HYDRIODIC ACID.

BY OTTO RAUBENHEIMER, PH.G.

THE following is a formula of "Syrupus Acidi Hydriodici Decolor," which will not darken on exposure to sunlight, a change that occurs in the syrup made after the N. F.*

A sample of this syrup has been kept in the shop window for about a year, exposed to the direct rays of the sun, without coloration or decomposition:

Sodium Hypophosphite	gr. 2
Potassium Iodide	gr. 140
Dissolve in	
Water	fl. dr. 6
and add	
Glycerin	fl. oz. 2
Then add	
Tartaric Acid	gr. 127
dissolved in	
Alcohol	fl. dr. 6
Set aside in a cold place for three hours, and add	
Syrup	enough to make fl. oz. 16

The amount of KI + $H_2C_4H_4O_6$ is calculated from the equation:

$$KI + H_2C_4H_4O_6 = KHC_4H_4O_6 + HI.$$
$$165.6 \qquad 150 \qquad 127.6$$

One fl. oz. of the finished syrup = 6.72 grs. HI = 6.66 grs. I. The same strength as Gardner's.

This process has the following advantages:

1. It is the glycerin that preserves this syrup so well.
2. The complete precipitation of $H_2C_4H_4O_6$.
3. The use of hypophosphite instead of hyposulphite—thiosulphite—recommended by some authorities.

The commercial KI always contains a trace of KIO_3, but this trace is sufficient to set free iodine in connection with HI.

$$5HI + HIO_3 = 6I + 3H_2O.$$

It is the hypophosphite that reduces the iodate to iodide, itself being oxidized to phosphate:

$$4KIO_3 + 6NaH_2PO_2 = 4KI + 3Na_2HPO_4 + 3H_3P_4O,$$
$$854.4 \qquad 528$$

showing that 1 part sod. hypophos. will reduce 1.6 part of pot. iodate. This change happens before the $H_2C_4H_4O_6$ is added, the result being a pure KI, and consequently a pure solution HI without free iodine.

HOBOKEN, N. J., March 12th, 1889.

[ORIGINAL COMMUNICATION.]

DECOCTIONS AND INFUSIONS VS. ALCOHOLIC PREPARATIONS OF PLANTS.†

BY J. U. LLOYD.

FROM time to time I am confronted with the fact that elaboration in pharmaceutical work is not always improvement—real improvement. I accept without question that the primary object of the pharmacist should be the therapeutical value of his products; elegance and physical appearance being very important considerations, but they are secondary. That I am a zealous advocate of pleasant medicines and a presentable form of remedies, and that I dislike, even detest, useless dirt in pharmaceutical preparations, even to the point of occasionally becoming ethically irregular, is known, and I candidly admit that in some instances the decoction or infusion of a crude drug seems to me superior to any known elaborated product of it.

That this statement is at variance with the commercial-return side of the life of the manufacturing pharmacist is true, and that my own pecuniary interests, if I consulted them, should prompt me to remain quiet is undeniable; and, lastly, that I may be criticised by some of my colaborers in pharmacy for drawing your attention to these truths is probable. They are facts, however, and should not be covered under a bushel, and I bow to the necessity that compels an expression of my opinions.

I will candidly say that, in accepting the fact that alcoholic liquid representatives of plants are often desirable, we are being drawn in some directions over broken ground. In my opinion, we should differentiate more; the rule of elaboration is usually a good one, but there are many exceptions to the employment of any alcoholic menstruum in plant extraction. The thrusting of a line of alcoholic fluid extracts, now typical of this class of preparations (followers of the alcoholic tinctures and essences), upon the profession has been conducive of injury as well as benefit. Manufacturers and physicians together have broadly accepted in this direction, often without proper discrimination, and, if my opinions are worthy of consideration, a halt should be called by physicians. Do not discard *all* of your infusions and decoctions because the majority of them may be better replaced with more refined drug representatives. Because a manufacturer or apothecary, by expert manipulation and attentive study, has evolved exceptionally effective alcoholic representatives of many plants, and made the practice of medicine with these agents more certain and the physician's relation to his patient more pleasant, do not argue that you can on general principles discard all that is old in favor of the new.

It disturbs me, as it probably does some other manufacturers, to be compelled to make certain pharmaceutical preparations that I know must be inferior products, simply because it is the fashion, and sometimes I am so rude as to rebel. True, they yield a commercial return, are usually profitable, but they are often worse than unnecessary. I realize that physicians using them will afterward resort to the more crude form of the drug, or drop it altogether, believing it to be worthless. But they lose time in thus groping about, or may lose a valuable life.

The introduction of a line of substances known as fluid extracts, made practically by a universal rule, has led, I believe, to some marked disturbances of this nature. Drugs that cannot properly be extracted with an alcoholic menstruum are too often thrust forward as unquestionably represented in an alcoholic form, and are so demanded by physicians.

Take the mucilaginous bark of the *elm*, a drug that should be stripped fresh from the tree, torn into shreds, and suspended in cold water, in order to produce the soothing, cooling, mucilaginous drink that is so refreshing to feverish patients. Its richness depends on its freshness. Each day this mucilage should be prepared anew, and the vessel containing it should be kept in a cold situation, and outside of the sick-room, to avoid absorption of foul exhalations. Is it not illogical to substitute for that mucilage a burning alcoholic "fluid extract" that neither can contain the mucilage of the bark, nor replace to the parching patient the grateful drink that may be prepared from fresh elm? Pass to other drugs, somewhat of this description, comfrey, benne, quince seed, and the same rule may be applied. The fresh infusion made with cold water is the best preparation, and every drop of alcohol added is at the expense of the value of the preparation. I do not hesitate to say that, in my opinion, a so-called fluid extract or tincture of such a drug is not a desirable preparation.

Consider now another class, drugs which, if we want to obtain positive effects, must be administered in large doses, and I believe that few persons will question that there is a like inconsistency in making alcoholic extracts of them. Pomegranate bark, pumpkin seed, male fern root, are all recognized as effective remedies in their sphere, but to be effective they must be given in quantities often inordinately large. The reputation of these remedies as employed in crude form, such as decoction, is not imaginary: they bring the answer unmistakably. This reputation was made by *decoctions* (oleoresin of male fern is valuable), has been maintained by decoctions, and will probably be retained in a like manner. That fluid extracts of all of them are sold, are ordered, are consumed, I do not deny, but that any of the alcoholic preparations are reliably effective I doubt. Better by far save money, save time, make reputation, by following the original method; prescribe a strong decoction of the drug, and administer it freely.* As a sialagogue, jaborandi appeared before the medical world under the introduction of an unquestionable authority, Dr. Ringer, who used it in *infusion* only. The record of its field of usefulness seems to be thoroughly demonstrated when it is taken in hot decoction, the reports being that the sweating was increased and more quickly induced when the *dregs as well as the decoction were swallowed by the patient.* To-day this drug is practically discarded (although highly commended in print), and the medical jury that pronounced the sentence relegating it to obscurity employed the fluid extract of jaborandi, a preparation altogether different from that used by its introducers.†

I rebel against such preparations as fluid extract of kino and fluid extract of catechu, and have displeased some patrons by refusing to make them. Other cases can be cited in which "fluid extract" inconsistencies occur, but it is unnecessary, although I might say that, in my

* In our experience, and that of many others, the syrup made after the Nat. Form. remains colorless, or practically so.—ED. AM. DRUGG.

† Read by request at the meeting of the Ohio Eclectic Medical Association, Akron, May 16th.

* Tannate of pelletierine is reported to be an efficacious representative of pomegranate bark.

† I do not overlook the alkaloidal constituent which *should* be a constituent of the fluid extract. This alkaloid is said to be of value, producing copious perspiration.

opinion, a decoction of apocynum is effective where an alcoholic preparation is useless,* and that the elaborate formula of the United States Pharmacopœia (1880) produces a fluid extract of chestnut inferior to an infusion of chestnut leaves. The lessons of these examples will, I think, be evident, and kindly considered. If I wished to administer to a member of my family pennyroyal, peppermint, sage, boneset, or other of most of the domestic remedies and many drugs now only known to the profession in fluid extract form, I would surely make a "tea" or decoction, and not give a fluid extract or tincture. I am a maker of fluid extracts and other similar preparations, and hence cannot be criticised by fair-minded persons for advising physicians of this society, who are largely my patrons, to benefit themselves and the patients, as I do now, at my own expense.

The evolution of pharmacy may yet give us positive testimony that will teach us where the decoction and infusion should rest and be supplanted by alcoholic preparations; but we have not yet in pharmacy reached that point. Of the comparative values of these classes there is little recorded; in many (perhaps most) directions, nothing is known, and I therefore freely say that, in my opinion, this fluid-extract hobby has been carried in some directions to extremes. The apothecary, the manufacturer, the physician seem to have crushed themselves together, and regardless of compatibles or incompatibles, of consistency or inconsistencies, have rushed thoughtlessly into an alcoholic craze. Deserving and commendable in many particulars, objectionable in others, I view fluid extracts as one of the stepping stones to a more perfect pharmacy which, by a series of evolutions, is destined to produce substances that will surely displace them in the future. They are a crudeness of the present, although they have improved our medicines in some directions by displacing others more crude, or given us portable preparations, but have in many cases crowded our shelves with preparations very much inferior to the decoctions and infusions, or even the crude drugs, that have been displaced. I do not propose to try to defend myself for the part that I have taken in this record, for I do not deny that my zeal in the past has helped to fasten the habit on others, neither do I close my eyes to the fact that many manufacturing pharmacists and their friends may even now decline to accept the situation as I see it.

In connection with this subject, I will candidly say that my experience has impressed me with the fact that, were I a physician, I should call upon the apothecary in numbers of instances for extemporaneously made infusions and decoctions, and should pay him for his services rather than prescribe several of the fashionable, ready-made, alcoholic preparations of the same drugs; or, I would direct them to be made at the bedside in the usual domestic manner.

New Method of Making Hydrobromic Acid.

V. Merz and E. Holzmann have studied the conditions under which hydrobromic and hydriodic acids are generated from the elements, and have found, at least for hydrobromic acid, a new practical process by which it may be prepared on the large scale. The process involves certain features which will have to be specially provided for, such as a constant, and of course cheap, current of hydrogen. But this is easily provided for.

The new process is as follows:

Conduct a *rapid* current of hydrogen, impregnated with much vapor of bromine, produced by warming bromine in a flask, successively through

1. A combustion tube (of glass, such as is used for ultimate analysis), kept at a low red heat in the combustion furnace;
2. Through a Woulf's bottle having three tubulures, into one of which an additional current of hydrogen passes to help carry forward the products of combustion;
3. Through a second, short combustion tube, at a red heat; and
4. Into pure water.

The object of the interposed Woulf's bottle is to permit a control of the quantity of bromine vapor produced by warming the flask containing it. Its quantity is recognized approximately by the more or less strong tint of the current of gas. If the latter is but slightly tinted, it will cease to contain free bromine after having passed the second combustion tube. In this way a colorless solution of hydrobromic acid gas is obtained, which may be made so concentrated as to become fuming.

The authors think it would be an additional advantage —in order to insure the entire absence of free bromine in the product—to pass the mixed current over metallic antimony before it is made to enter the water. But, as Harding has pointed out (see New Rem., 1882, 43), the current must be cold when it passes the antimony. Suitable provision must therefore be made to cool the current. —After *Berichte*, 1889, 868.

* Prof. Thomas recently read a paper before the Cincinnati Society, speaking in the same way of apocynum

Antipyrin and Quinine.

It has recently been pointed out that antipyrin possesses the property of increasing the solubility of some salts of quinine. If 0.4 to 0.5 Gm. (6 to 8 grains) of antipyrin be added to 1 Gm. (16 grains) of quinine hydrochlorate, it will dissolve in 2 Gm. of water at a temperature of 20°-31° C.; and with only 0.2 to 0.25 Gm. (3 to 4 grains) added, it will dissolve at 44°-50° C. Without any addition, 1 Gm. of quinine hydrochlorate requires a temperature of 53° to 56° C. to dissolve it in the same quantity of water. Moreover, whilst upon cooling the quinine salt, if alone, crystallizes out at once, the quinine-antipyrin solution can be preserved a long time unaltered. The almost insoluble valerianate of quinine behaves similarly. Possibly this fact may be utilized in preparing hypodermic solutions of quinine.—After *Ph. Journ.* and *Apoth. Zeit.*

Antipyrin and Sodium Salicylate.

Mr. Prudhomme recently called attention to the incompatibility of antipyrin with a salicylate, and advised that they be never combined together in form of powder. In commenting upon this (in *Bull. Comm.*, March 31st), Mr. Vigier said that these compounds, when dispensed in contact with each other in the dry state, appear to undergo decomposition, whether the crystallized or the amorphous salicylate be used, with the formation of an oily liquid that renders the mass pasty, and may in 24 hours constitute 10% of the whole. No perceptible alteration takes place, however, in a *solution* of the two compounds. Although the reaction of sodium salicylate is faintly acid, the pasty product of the salt with antipyrin is alkaline. A solution of the two compounds, however, remains acid.—*Pharm. Journ.*

Arsenic in Glass and in Soda.

W. Fresenius and U. Kreusler some years ago announced that they had met with glass containing arsenic, in Germany. This is now also announced by J. Marshall and Charles S. Potts (in *Amer. Chem. Journ.*, 10, 425), who found in three different kinds of glass of German origin 0.095 to 0.127% of arsenious acid, and in four specimens taken from a Philadelphia glass factory 0.191 to 0.446%. They also examined caustic soda and carbonate of sodium, and found arsenic in every sample, except those prepared by Solvay's process.

On keeping a 10% solution of soda in bottles made of arsenical glass, distinct traces of arsenic were taken up by the solution after 96 hours. A 10% potassa solution required only 24 hours to absorb traces. It seems that only alkalies withdraw arsenic. On keeping strong sulphuric or hydrochloric acid in such arsenical flask, not a trace of arsenic is taken up after several days. Other reagents have likewise been found to be non-absorbent.

Iodate of Calcium as a Disinfectant.

Dr. Klein has studied the antiseptic and disinfectant effects of iodate of calcium, and reports that it is a moderately powerful agent in many cases, though it will not destroy the more resistant spores or bacilli, such as the bacillus anthracis of the blood, the cholera bacillus of Koch, etc., etc. It has, however, this advantage over corrosive sublimate, that it is not poisonous, at least in the quantity in which it would likely be taken if a liquid containing it were accidentally swallowed. A solution of 1 in 500 is sufficiently effective as an ordinary disinfectant, and certainly more powerful than a similar one of carbolic acid.—After *Brit. Med. J.*

The True Way to "Make Coffee."

Dr. W. Junker, the African traveller, makes the following remarks on making coffee in his recent work, "Reisen in Afrika" (Wien and Olmütz, 1889, pg. 208):

Any European who believed that the decoction of coffee-beans which he had tasted at home deserved the name of "coffee," is soon convinced of his error after sojourning for a while in Turkey, Egypt, or Arabia. He will, indeed, at first be somewhat surprised always to find some sediment in his cup, which he is apt to overlook until he has swallowed some. But he will soon learn to sip the aromatic liquid carefully from off the sediment. . . . The proper way to prepare coffee is as follows: The beans, which should, of course, if possible, be of the very best quality (genuine Mokka), are carefully examined, and all damaged ones picked out, constituting then what is known as *el-bünn es-ssafi*. Immediately before use, the requisite quantity is freshly roasted and powdered, which latter is preferably done in a wooden mortar. The powder should be quite fine, like flour. Water having been brought to a boil in a suitable kettle or vessel, a certain quantity of the powder—a small spoonful for every small cupful of coffee to be drawn from the vessel—is added, the whole stirred, and the vessel replaced on the fire until the liquid boils and foams up. It is then removed, and the coffee served.

THE ART OF DISPENSING.*

[Continued from page 83.]

INGREDIENTS OF PILLS AND HOW TO MASS THEM.

Acetate of Potassium, which seems one of the most unreasonable things to put into a pill, makes, according to Whitla, a good mass with Canada balsam, and remains stable. A more desirable mass is obtained with borotartrate of potassium—for example, acetate of potassium, 18 parts; borotartrate of potassium, 3 parts; water, 1 part, can be made into pills without much difficulty, and they keep well in corked bottles.

Acids of mineral origin are rarely, if ever, prescribed in pill form, unless it be an occasional German prescription. With the addition of powdered marshmallow root and glycerinated water, good plastic masses are obtainable, as, for example:

Pepsin.....*Gr.* 40
Powdered Rhubarb.....“ 80
Extract of Gentian.....“ 24
Muriatic Acid.....*gtt.* 20
(*Marshmallow powder and glycerinated water, each gr.* 8).
To make 100 *pills.*

Such pills should be dispensed in a bottle.

Benzoic Acid makes a good mass with a drop of glycerin to every 5 grains, but Canada balsam generally gives better results, especially when the balsam is fresh and thin.

Gallic Acid makes a good mass with an eighth to a sixth of its weight of glycerin.

Aloes in any fair proportion, and particularly when combined with colocynth, scammony, and soap, is best made into pills with compound decoction of aloes. It has great solvent power and must, therefore, be used sparingly. The many compounds of aloes, mastic, and soap are best massed with this excipient, but the dispenser must guard against chemical action. The value of this excipient lies chiefly in the carbonate of potassium, which is an active solvent of organic substances, but not in every case a desirable ingredient. Aloes alone is better handled by adding some fibrous material, and if massed with mucilage of gum arabic, and rolled out quickly, the pills keep their shape very well. Large quantities should be made with the aid of a hot plate.

Antipyrin.—Use 1 grain of tragacanth with each 5 grains, and as little water as possible.

Balsams, Oils, etc.—Pill masses are sometimes required with fluid or soft resins, fluid balsams, oils, or fats, as ingredients. When the quantity of these is too large to admit of the formation of a mass by the addition of any reasonable quantity of powder, recourse must be had to wax. Balsam of Peru, copaiba, extract of male fern, oleoresin of cubeb, creosote, carbolic acid, ethereal oils, and other substances, melted by gentle heat with one-third to an equal weight of wax, yield, according to Hager, very good pill masses, but the mixture must be quite cold before combination with any other ingredients. The addition of ether or spirit destroys the plasticity of this compound. The wax, with the medicament, must be melted very slowly in a porcelain dish, as the application of a strong heat would be likely to injure the medicinal properties. In using wax, the dispenser must be careful that he does not bring the resulting mass to such a degree of hardness that the pills will not disintegrate in the alimentary canal. This is the great objection to the use of wax. An ordinary pill, though much harder than a wax pill, may dissolve in the stomach, because its ingredients are soluble in water. Wax pills are generally insoluble in water, and it must be concluded that they are of little, if any, medicinal value.

Balsam of Peru is seldom ordered alone in pills. When demanded, it may be massed with slaked lime, in fine powder, 15 grains being sufficient for 30 grains of balsam. Two drops each of castor oil and alcohol aid the formation of a good mass, which should stand for an hour before being rolled.

Copaiba was formerly much used in pill form, and carbonate of magnesium was the favorite excipient; but the mass becomes of stony hardness and quite insoluble. A better plan is to make a gum emulsion, and then add 1 part of calcined magnesia for every 10 parts, by weight, of the balsam. In about twelve hours the emulsion will have become of the consistence of a cerate, when the addition of a little borax will give an excellent mass, which keeps for a long time and requires only to be worked in a warm mortar when it is old. Pills made in this way are extremely soluble in the digestive fluids. Phosphate of calcium is also a good excipient.

Butyl-Chloral Hydrate (croton chloral) should not be combined with such substances as confection of rose or extract of gentian, owing to its giving a dark-colored mass. Whenever possible, white substances should be made into white pills. Equal parts of powdered acacia, tragacanth, and syrup make a good pill of this substance.

Calcium chloride does not give pills which silver well, unless special precautions are used. Use Canada balsam to make a mass, and coat the pills with tulu dissolved in ether. After five minutes moisten them slightly with thin mucilage applied by a finger and thumb, and drop them into the silver leaf; then proceed as customary, and send the pills out in a corked bottle to prevent absorption of moisture.

Calomel makes a very good mass with manna, or the following:

Calomel.....*gr. xxiv.*
Powd. Tragacanth.....*gr. ij.*
Confection of Rose.....*q. s.*

Camphor generally gives trouble. Use sublimed camphor or reduce it to fine powder with the help of a little alcohol; then, if the pill is to contain camphor simply, mass with glycerite of tragacanth, or use 1½ grains of carbonate of ammonium to each half-grain of camphor. Some dispensers prefer using for each pill of 3 grains of camphor a half-grain of soap and half a drop of olive oil. Another method, for large pills, is the following:

Camphor.....*gr. xxiv.*
Castor Oil.....*gtt. iij.*
Soap.....*gr. ij.*
M. Make six pills.

When any green extract is ordered with camphor, powder the latter with the aid of a little water instead of alcohol. The extract will then make a good mass, which retains its consistence for some time. If the extract should give too soft a mass, it may be stiffened with powdered curd soap [“curd soap” is ordinary soda soap made with tallow or other animal fats] or a mixture of curd soap with powdered licorice.

When there is a large proportion of a gum-resin in a mass, alcohol is a good excipient, as in the following cases:

Powd. Asafœtida.....℈*v.*
Oxide of Zinc.....*gr. xij.*
Powd. Camphor.....*gr. vi.*
Extract of Belladonna.....*gr. iij.*
To be made into 24 *pills.*

Extract of Belladonna.....*gr. iv.*
Powd. Camphor.....℥ *ss.*
Sulphate of Quinine.....℥ *i.*
Sulphate of Zinc.....*gr. x.*
To be made into 30 *pills.*

In the last example, powder the camphor by the aid of a drop or two of water and the zinc sulphate, add the quinine and extract, with a few grains of tragacanth, and make a mass with a mixture of 2 parts of simple syrup and 1 of glycerin.

Carbolic Acid in crystals is especially convenient for making pills, and the excipients commonly used are wheat flour, powdered soap and licorice, soap and tragacanth with glycerin, powdered marshmallow with a trace of glycerin, etc. Success with either of these depends greatly upon habit.

The excipient to be used must depend upon the nature of the mass. For example:

Subnitrate of Bismuth.....*gr. iij.*
Carbolic Acid.....*gr. i.*

This makes a good pill by incorporating with the acid a half-grain of powdered curd soap, adding the subnitrate, and massing with a very little glycerite of tragacanth.

Resin of Podophyllum.....*gr.* ½
Compound Rhubarb Pill.....*gr. iij.*
Carbolic Acid.....♏ *i.*

Incorporate the phenol with an equal weight of soap; then add the powdered ingredients of the compound rhubarb pill, the podophyllin, and a little powdered tragacanth. Mass with a little molasses. (See also Creosote.)

Cascara Sagrada Extract.—Stiffen with powdered tragacanth and licorice, and varnish the pills.

Corrosive Sublimate in pills should first be rubbed to fine powder with twice or thrice its weight of sugar-of-milk, and the other ingredients, excepting the excipient, added little by little, so as to insure a perfect mixture. Some authorities insist that all potent substances should be combined in a state of solution, as, for example:

Corrosive Sublimate.....*gr. i.*
Glycerin.....*gr. i.*
Confection of Rose.....*gr. v.*
Powdered Acacia.....*gr. x.*
To make 8 *pills.*

The mercurial being dissolved in the glycerin, perfect distribution is secured. If it be dissolved in ether and the solution triturated with powdered licorice, the salt is very finely divided. Dzondi's sublimate pills are made with 0.75 Gm. of corrosive sublimate with bread-crumb and sugar, of each sufficient to make 250 pills. The salt should be thoroughly mixed with 3 Gm. of sugar; to this 10 Gm. of sugar, 13. Gm. of dried bread-crumb, and 4.5 Gm. of glycerinated water are to be added.

Creosote.—Mr. Martindale considers powdered curd soap to be the best excipient. Equal parts are to be well mixed in a stoppered, wide-mouthed bottle and placed in a water-bath until they are combined. This, on cooling, forms a

*Adapted from “The Art of Dispensing,” published by the *Chemist and Druggist.*

mass which can be combined with other ingredients, preferably in powder. A few shreds of yellow wax with a little powdered soap make good (though somewhat insoluble) pills. Powdered licorice may be used in place of soap. Light calcined magnesia (1 grain to 2 minims of creosote) mixed with creosote solidifies in a few hours, and can then be formed into pills, but is unadvisable owing to its insolubility. Always be careful about adding a chemical such as magnesia, owing to the changes which are liable. Powdered soap 1 part, powdered licorice root 5 parts, is a mixture 3 grains of which make a good mass with 1 minim of creosote. Animal soap is far better for massing pills than castile soap; *e. g.*, creosote, gtt. xij.; curd soap, dried and powdered, gr. vi.; phosphate of lime, q. s., make a good mass and a small pill, but with castile soap this would not be the case.

Croton Oil.—Powdered curd soap with a little glycerite of tragacanth does well with a prescription like one calling for 5 drops of croton oil with confection of rose, sufficient to make 4 pills.

Crystalline Salts, soluble in water, require a little care. They should be very finely powdered, and massed with thin conserve, adding, if necessary, a little tragacanth, or preferably with glycerite of tragacanth and a little inert powder. If silvered, they must be varnished with tolu and allowed to dry before using mucilage, or else silvered with the varnishing solution alone.

Bromide of Potassium.....ʒ ss.
Sulphate of Iron .....ʒ ss.
Extract of Nux Vomica.....gr. ijss.
Extract of Gentian.....q. s.
To make 15 *pills.*

In this formula double decomposition takes place between the two salts, the water of crystallization in the sulphate being liberated; consequently a very small quantity of extract suffices. Since bromide of iron is formed, the pills should be varnished and dispensed in a bottle.

Sulphate of Quinine.....gr. xxiv.
Dried Sulphate of Iron.....gr. xxiv.
Arseniate of Iron .....gr. iss.
Extract of Nux Vomica.....gr. vi.
Iodide of Iron .....gr. xlviij.
To make 24 *pills, varnished with tolu.*

This is likely to prove troublesome. Recently prepared iodide of iron should be powdered in a warm mortar, the other ingredients added, together with 5 grains of glycerite of tragacanth; the whole is to be vigorously worked together until it becomes plastic, rolled quickly, varnished, and inclosed in a bottle. Six or eight grains of extract of gentian also make a good mass.

Ergotin is variable in consistence but usually requires the addition of an inert vegetable powder to give it consistence. If there be more than two grains in each pill, it requires evaporation in order to keep the pills of reasonable size. The addition of about a twentieth part of tragacanth to each part of ergotin is an improvement.

Essential Oils.—The addition of wax or resin should be the last resort, but is sometimes unavoidable, as in the following case, where soap would be objectionable owing to the double decomposition between the ferrous sulphate and the soap:

Dried Sulphate of Iron.....gr. 1½.
Aqueous Extract of Aloes .....gr. i.
Oil of Savin .....ɱi.
Make 144 *such pills.*

Melt 72 grains of yellow wax on a water-bath and add the oil, gently beating, if necessary, till they are thoroughly mixed. Mix the aloes and ferrous sulphate with 12 grains of powdered tragacanth. Pour upon this the oil and wax. Mix well and mass with a little glucose syrup. This makes a beautiful 4-grain pill.

Soap is generally all that is required to make a tractable mass. For example: powdered soap, 1 part; powdered licorice root, 5 parts. Three grains will make a good mass with 1 minim of an essential oil and a little water or alcohol. In a case like the following the licorice should, of course, be omitted:

Powd. Rhubarb.....gr. i.
Powd. Ginger.....gr. i.
Oil of Caraway.....ɱ i.

Rub the oil with one grain of powdered soap, add the powders, and mass with the smallest possible quantity of molasses.

When powders are resinous, as in compound extract of colocynth, compound pill of asafœtida, aloes, etc., they should be triturated with the oil for a few minutes, the remaining ingredients, if any, added; then, if too hard, use alcohol, or, if too soft, sufficient licorice and soap.

A little solution of potash is often of great service in a mass containing much essential oil. Its use is, however, to be deprecated in the majority of cases.

Essential oils frequently form good excipients, as in the following examples:

Mass of Mercury.....gr. iv.
Powd. Comp. Ext. Colocynth.....gr. vi.
Resin of Podophyllum.....gr. ¼.
Oil of Anthemis.....ɱi.
M.

Powd. Pill of Aloes and Iron.....ʒ i.
Powd. Guaiacum Resin.....ʒ i.
Oil of Savin .....ɱxv.
To make 24 *pills.*

Extract of Nux Vomica.....gr. ¼.
Creosote.....ɱi.
Asafœtida .....gr. iij.
Powd. Licorice.....gr. ij.

Extract of Hyoscyamus .....gr. i.
Powd. Comp. Pill of Colocynth.....gr. iv.
Oil of Cajuput.....ɱi.

Extract of Cannabis Indica.—Licorice or lycopodium makes a good mass; failing which, compound tragacanth powder and carbonate of magnesium in equal parts may be tried.

Extract of Taraxacum.—The following was once dispensed:

Extract of Nux Vomica.....gr. iij.
Extract of Taraxacum .....gr. xij.
Aqueous Extract of Aloes.....gr. ij.
Extract of Hyoscyamus.....q. s.
To be made into 12 *pills and silvered.*

The pills split open after being silvered, even though varnished. The swelling was no doubt due to the taraxacum extract, which is commonly in a state of incipient decomposition, and silvered pills made with it frequently split. The best plan is to evaporate the extract almost to dryness and use a little tragacanth, as well as extract of hyoscyamus to make a mass. The mass should not be too hard, and the pills should stand half an hour before silvering.

Bromide of Iron.—The Société de Pharmacie de Paris recommends a hot, strong solution of the bromide to be mixed in a dry, warm porcelain mortar with licorice powder and gum arabic in equal parts, sufficient to make a mass. The pills should be rolled in lycopodium, or, better, sugar-coated, and preserved in a well-dried bottle.

Iodide of Iron.—Blancard's iodide of iron pills were formerly directed to be made as follows: Combine 4 Gm. of iodine with 2 Gm. of powdered iron in 8 Gm. of water; filter upon 5 Gm. of honey, evaporate to 10 Gm., and make into pills with marshmallow and licorice. A shorter and equally good process is to stir 2 Gm. of iron with 4 Gm. of iodine in 4 Gm. of distilled water in a porcelain mortar until the brown color has disappeared. Then add 4 Gm. of white sugar, 3 Gm. of marshmallow, and 7.5 Gm. of licorice. Make 100 pills, roll them in powdered soapstone, and dry in a warm place. Varnish with tolu.

Citrate of Iron and Quinine.—For this many excipients are used, and success with any of them depends greatly on habit. Good pills, which keep their shape and do not deliquesce, can be made by using resin cerate as an excipient. Alcohol makes a good mass, but quick rolling is essential.

Sulphate of Iron.—The granulated sulphate should be used for pills; it is generally free from adhering moisture, can be readily reduced to impalpable powder, and massed with glycerite of tragacanth with the addition of a little powdered sugar.

Dried Sulphate of Iron, as obtained from wholesale houses, is a very variable substance. Owing to overheating, it may contain basic sulphate of iron. Dispensers should, therefore, hesitate before using it in place of the undried in order to make a smaller pill. One peculiarity of pills made with dried sulphate is their liability to split

Sulphate of Quinine.....gr. xv.
Extract of Belladonna.....gr. x.
Dried Sulphate of Iron.....ʒ i.
To be made into 30 *pills.*

This was made into a mass with 4 gr. of tragacanth and a little glycerin, but after about three weeks the pills cracked. A mixture of glycerin 1 part, and water 2 parts, makes a much better mass in this case, especially if a few grains of powdered acacia are used along with the tragacanth, and triturated with the iron salt before the other ingredients are added.

Blaud's (ferruginous) *Pills.*—The originals were made by heating together sulphate of iron and carbonate of potassium in honey, then adding other ingredients, and evaporating to a proper consistence. The combination is now presented at the dispensing counter in various forms, such as ferrous sulphate with carbonate of sodium or potassium. With these we shall deal presently. As exceptional forms we may note the following:

Sulphate of Iron .....gr. ij.
Bicarbonate of Potassium.....gr. ij.
Confection of Rose.....q. s.

Granulated Sulphate of Iron..... .....gr. ijss.
Bicarbonate of Sodium ..... gr. ijss.
Glycerite of Tragacanth..... ..q. s.

Leaving the question of massing, it will be noticed that sulphate of iron with an alkaline carbonate or bicarbonate undergoes double decomposition, and in the latter case the freed carbonic-acid gas greatly affects the resulting mass. Either the salts must lie until all the gas is expelled (whereby the ferrous salt is much oxidized by exposure) and then massed, or the pills may be made at once with the consequence of being much larger than they should be, owing to the retained gas. It is advisable, therefore, in such cases as are above mentioned, to substitute a proportionate amount of the carbonate for the bicarbonate. It is also apparent that, owing to the liberation of water of crystallization, soft excipients, such as are directed above, are inadmissible.

Opinions regarding Blaud's pills are various. Whitla, for example, considers that when pills containing 2½ gr. each of sulphate of iron and carbonate of potassium are prescribed, a mass should be made with petrolatum and cacao butter in order to avoid decomposition. Another writer advises that the salts be reduced to powder separately, then intimately mixed with a twelfth of their combined weight of tragacanth and massed with a twentieth of their weight of water.

Hager advises rubbing the iron salt in an iron mortar with the alkaline carbonate until a damp mass is formed, which is to be set aside for 15 to 20 minutes. Its consistence is then thin and muddy. To this are then added about $\frac{3}{10}$ of its weight of tragacanth and a few drops of glycerinated water, and the mass is again set aside for 10 minutes. If it is then at all crumbly, a few drops more of glycerinated water may be added, and a good mass will result.

Neither of these methods is advisable for the dispensing counter. Mix the salts, add $\frac{1}{10}$ of their weight of powdered tragacanth and the same amount of sugar, and mass quickly with the least water possible, about 5 minims sufficing for a dozen 5-grain pills. Note that equal proportions of the alkaline carbonate and ferrous sulphate give an excess of the alkali. Three parts of the former and 5 parts of the latter give better proportions.

Reduced Iron should be rubbed to a fine powder, a little licorice added, and a mass made with glycerite of tragacanth; or manna alone may be used. When combined with vegetable extracts containing, as most do, some acid ingredients, the addition of moisture, according to Hager, occasions development of hydrogen and combination of the iron, with liability of the pills to swelling. Of course the extracts should not be acid.

Guaiacate of Lithium.—Powder finely and use alcohol, ♏ viij. to each ʒ i. A soft mass should be made, and the use of slight warmth is advantageous.

Mercury with Chalk must not be vigorously worked in a pill mortar, or the mercury separates. Thin conserve or a soft extract forms a good excipient. With powders, or pill masses which can be used in powder, gray powder should be carefully triturated with such ingredients first to avoid the chance of mercury separating.

Insoluble Salts, or such as are nearly insoluble in water and are devoid of adhesive property (such as oxysalts of bismuth, oxalate of cerium, etc.), are best massed with glycerite of tragacanth, although equal parts of acacia, tragacanth, and syrup sometimes give more adhesiveness and excellent results.

Lupulin and Camphor are not readily made into a plastic mass with the usual excipients without considerably increasing the size of the pills, but either alone, if very sparingly used, yields a good mass.

Ox-Gall forms good pills with equal parts of tragacanth and acacia. It may be had dried and powdered, and in this state it is very convenient and forms a good mass with concentrated compound decoction of aloes.

Pepsin.—Make a soft mass with a mixture of equal parts of glycerin, syrup, and water, and roll quickly. One minim of dilute hydrochloric acid makes a very good mass with 5 grains of pepsin.

Phosphorus.—A mass made with balsam of tolu is recommended; but it is said that the balsam must be washed to separate several bodies lighter than water and such contaminations as cinnamic and benzoic acids. Moreover, the resinous matter is thus saturated with as much water as it will retain. A mass is made with 40 grains of phosphorus and 960 grains of washed balsam by placing them in an enamelled iron basin capable of holding 40 oz. and containing about 20 oz. of water. Heat the basin on a water-bath, and, when the ingredients are melted, stir with a glass rod until particles of phosphorus can no longer be seen, taking care that the ingredients are not brought above the surface of the water. After fifteen minutes' continuous stirring, remove the basin and place it under a stream of cold water. When cool, mix it further under the water with the hands for a short time, and finally place it, under water, in earthenware jars. One grain of this mass contains $\frac{1}{25}$ grain of phosphorus, and the mass may be combined with any ingredients.

Phosphorus pills made with cacao butter dissolve so readily as to cause unpleasant eructations, but a smaller dose of this mass appears to be more effective.

The following formula by Allen & Hanbury is a favorite one with many pharmacists:

Phosphorus..... .....gr. ij.
Bisulphide of Carbon... ....♏. x. *or q. s.*
Dissolve.

Powdered Hard Soap.....gr. xxxv.
Powdered Guaiacum Resin.....gr. xxxv.
Glycerin.... .....gtt. xij.
Powdered Licorice Root.....gr. xij. *or q. s.*
Make a mass of 100 *grains. To be divided into pills of the strength required, and varnished or coated in the ordinary way.*

The mass is of good consistence; is easily manipulated, and readily soluble. A drop of oil of cloves added to the carbon bisulphide is said by Mr. Proctor to lessen its tendency to inflame.

The bisulphide-of-carbon method is most expeditious for the dispensing counter. Rub up some licorice powder (½ to 1 grain for each pill) with half its weight of water, pour on the bisulphide solution, stir well and without pressure, and make into a mass with compound tragacanth powder. The water effectually prevents oxidation of the phosphorus, and the bisulphide is dissipated in massing.

This method is also suitable in such a case as the following:

Sulphate of Quinine... .....gr. ½
Extract of Nux Vomica.....gr. ½
Phosphorus.... .....gr. $\frac{1}{33}$

If you have to make, say, 33 pills, rub the quinine and extract together with 15 grains of powdered licorice and 5 drops of water. Now dissolve the phosphorus in 5 or 6 drops of bisulphide of carbon in a small test-tube; mix with the other ingredients, and mass quickly with glycerite of tragacanth.

Phosphorus pills should always be varnished or coated with a solution of wax in ether (1 in 7), and finished off with powdered soapstone.

Pill of Aloes and Myrrh.—The best excipient is a mixture of glycerin 1 part, and molasses 3 parts.

Compound Pill of Colocynth, when made with resin of scammony, invariably flattens. This may be prevented to some extent by adding 10 to 20 drops of solution of potassa to each ounce of mass, or by substituting soap for the sulphate of potassium. The addition of a fibrous powder, such as licorice, gives durability to the mass. Pill of colocynth with hyoscyamus requires only the extract to mass it.

Mercurial Pill, when prescribed with a soft extract, should, if possible, have the extract first dried or powdered. Compound pill of calomel, with pill masses having an aqueous excipient, invariably forms a crumbly combination, which is remedied by using the former in powder—*i. e.*, by omitting the castor oil.

Iodide of Potassium may be made into pills, according to Whitla, by rubbing the salt with a few drops of water into a stiff, smooth paste, and massing with a little powdered licorice. In this way 6 grains may easily be got into a fair-sized pill. Tragacanth and water alone make a good mass. A pill containing this iodide and a considerable quantity of extract of colchicum was ordered, and, although carefully dried extract was used, the mass was too soft. As the pills were not required till next day, they were placed under a jar with sulphuric acid, which succeeded in extracting the excess of moisture.

Permanganate of Potassium.—Obviously no substance which is readily oxidized, such as extract of gentian, glycerite of tragacanth, among common excipients, should be used. The excipient must be a substance which is practically unoxidizable, and such we have in various fats and earths. For example, resin cerate 1 part, and permanganate of potassium 4 parts, make a good mass, but if kept for some time it dissolves with great difficulty. Neither petrolatum nor petrolatum and paraffin give sufficient firmness, but the addition of kaolin (white potter's clay) renders it of proper consistence. Equal parts of petrolatum, paraffin, and kaolin may be kept on hand as an excipient, and may be made by melting the former two and sifting in the powdered kaolin, with constant stirring until the mixture is cool. A very good mass is made with kaolin and water, or fuller's earth and water; 18 grains of fuller's earth and 12 grains of the permanganate forming a mass with very little water. The best coating for such pills is a solution of white paraffin in benzin, afterwards finishing off with French chalk. The following formula has to be treated on the principles above laid down:

Permanganate of Potassium,
Oxide of Iron.... ....*aa* ʒ *i.*
Muriate of Cinchonidine ... . ʒ *iss*
To be made into 48 *pills and silvered.*

Make a mixture of paraffin and petrolatum, of each a half-drachm; to this add the cinchonidine in fine powder,

then add the permanganate and the oxide of iron, also in fine powder, and stiffen with a little powdered kaolin, if necessary.

Quinine Sulphate.—The simplest excipient is glycerite of tragacanth; or five per cent of tragacanth, well mixed, forms a good mass with simple syrup. A little glycerin may be added if the pills are to be kept long. The use of extract of gentian or other dark-colored excipient is objectionable. Sulphuric acid is now extensively used as an excipient, 1 drop of the aromatic sulphuric acid being sufficient for 4 grains of quinine. Mass quickly and roll in powdered soapstone or fine, sifted arrow-root. An excellent mass is made with tartaric acid and a little water and glycerin. For 12 five-grain pills take 6 grains of tartaric acid, and rub it with the quinine until it becomes crumbly, then add 2 drops each of glycerin and water and mass quickly. An objection to tartaric acid is that it alters the chemical constitution of the quinine salt, sulpho-tartrate being formed. Its therapeutic value is, however, the same.

The judgment of the dispenser must be used in unusual cases, as, for example:

Sulphate of Quinine.....*gr. iss.*
Tar.....*gr. iij.*

In this case an inert powder, such as lycopodium or licorice, adds too greatly to the bulk of the pill. If melted with a fifth of its weight of wax, the tar becomes more tractable and masses well with calcium phosphate.

Resinous Ingredients in Pills.—Gum resins and resins must first be rubbed to a fine powder, and, to prevent sticking to the mortar, it and the pestle may first be rubbed with paper soaked with almond oil. The resinous powder is easily made into a mass with a few drops of alcohol, but pills so made do not keep their shape. To most of such substances, and to aloes especially, the addition of a little vegetable powder or scraped blotting-paper is desirable. Asafœtida gives pills of good consistence with a few drops of weak alcohol; but such an addition with aloes produces pills which flatten. Alcohol should be added cautiously, as it is often found, especially when soap is present, that the mass becomes softer as it is worked. Mucilage of acacia is a much safer excipient than alcohol. If alcohol is used, the main thing to be observed is to do so sparingly. The mass, for example, should not be made as soft as those made with ordinary excipients, but should, on the contrary, be so hard as to require some degree of pressure in rolling. If this precaution be observed, the pills will not lose shape. When, however, the pills are to be kept for some time, a less drying excipient should be used.

Powdered Rhubarb.—Use diluted alcohol or tincture of rhubarb (1 minim to 3 grains). A soft mass should be made and rolled quickly, otherwise it is troublesome. If more than 24 pills be attempted at once, the mass assumes a leathery consistence and will have to be thrown away.

Powd. Rhubarb.....*3 i.*
Powd. Curd Soap.....*3 i.*
Powd. Ipecac.....*gr. vi.*
To be made into 24 pills.

This makes a good mass with 25 minims of tincture of rhubarb.

Rhubarb is one of many substances for which each experienced dispenser has his own excipient, as may be inferred from the following examples from various sources:

(1) Simple syrup is better than either alcohol or water for massing powdered rhubarb.

(2) Use a mixture of equal parts of glycerin and tincture of rhubarb (1 minim to 3 grains).

(3) For powdered rhubarb, a mixture of 2 parts of glycerin with one part of alcohol answers well.

(4) Powdered rhubarb makes a good mass with one-fifth its weight of glycerin.

(5) Molasses is the most valuable excipient for powdered rhubarb.

Bicarbonate of Sodium, 3 grains, with 1 grain of powdered ginger, can be made into a very workable mass by the addition of 1 grain of tragacanth, and water or glycerin sufficient to make a mass. The pills both roll well and keep well.

Sulphide of Calcium (sulphurated lime) should be mixed with an equal quantity of sugar-of-milk, and, after careful trituration, as much powdered, decorticated licorice root added as will make the weight about 1 grain for each pill. The mass can then be easily made with glycerite of tragacanth.

Tannic Acid, if made into pills with mucilage, will crack, crumble, and fall to powder as soon as the pills are dry. A mixture of glycerin with the mucilage makes an excellent excipient.

Valerianate of Zinc.—Add a small quantity of acacia, and mass with alcohol. This gives a mass requiring quick manipulation, but yielding excellent results. Glycerite of tragacanth also makes a good mass with the addition of a little inert vegetable powder.

(To be continued.)

Notes on Commercial Drugs, Chemicals, and Essential Oils.

[From the April Reports of the firms of Gehe & Co., of Dresden, and Schimmel & Co., of Leipzig.]

Adonidin.—This glucoside continues to be in considerable demand in Southern Europe, though it is much less used in Germany. According to Podwyssotzki, the real, active principle of *Adonis vernalis* is a bitter substance, called by him *picroadonidin*. This is a glucoside, amorphous, soluble in water, alcohol, and ether, of very bitter taste, and has hitherto formed, more or less, a constituent of the commercial adonidin.

Aluminium.—As previously announced, the aluminium factory at Oldburg, near Birmingham, turns out daily about 500 pounds of aluminium (cost about 16 shillings per pound). Although this is a very notable quantity, yet the price is still an objection to its more universal introduction.

Antifebrin, or acetanilide, maintains its place among antipyretics, and has rather increased in consumption than diminished. Gehe & Co. estimate the quantity at present consumed at three times that of antipyrin.

Amyl Nitrite.—In place of the usually employed amyl nitrite, prepared from commercial amylic alcohol, which is itself a compound of various isomers, Messrs. Bals and Broglio have recommended the use of the nitrite prepared from the true tertiary amylic alcohol. This has to be prepared from amylene hydrate, and in consequence thereof commands a very high price.

Antipyrin.—In spite of the rivalry of antifebrin, the consumption of antipyrin has become a very large one. Its value depends not only upon its multifarious effects, among which its antipyretic use is almost overshadowed, but also upon its general innocuousness, and last, but not least, upon its ready solubility in water, which permits its employment in the most varied forms.

Anthrarobin.—The factory which had been engaged in the preparation of this artificial substitute for chrysarobin discontinued its manufacture for some time, owing to a cessation of demand. It may be judged from this that the substance has not been found to possess sufficiently remarkable advantages over chrysarobin.

Atropine and Atropine Sulphate.—The sulphate of atropine, hitherto known as such in commerce, and prepared by various methods from belladonna root, has always been a mixture of so-called "light" and "heavy" atropine (sulphate). According as more or less alkali, or a longer or shorter contact of the latter, had prevailed during the manufacture of the alkaloid from the root, the more evanescent or the more stable form of the alkaloid (hyoscyamine or atropine) prevailed in the product.

Accordingly, also, the respective melting points of the gold salts vary. (The pure atropine gold salt melts at 136° to 138° C., and the pure hyoscyamine gold salt at 159° C.)

Even before Prof. Schmidt showed how hyoscyamine could be converted into atropine by heating it beyond its melting point, and also before the observations of Will (see this journal, 1888, p. 141) were made public, the free alkaloid atropine was known under two forms, viz.: 1. "Heavy" (melting at 115° C.); and 2. "Light" (melting at 108° C.), and it was easy to separate these during the manufacture. All pharmacopœias, with the exception of the recent Japanese Pharmacopœia, restricted themselves to a general characterization of the salt usually sold as sulphate of atropine, which consisted of varying proportions of the "heavy" and "light" alkaloid. The Japanese Pharmacopœia has made a new departure, and recognizes only the sulphate prepared from the "heavy" alkaloid. Though it does not state the melting point of the double salt with gold, yet the whole description shows that this variety is meant. Gehe & Co. announce that they will in the future offer for sale both the light and the heavy alkaloid, and the sulphates prepared from both, so that purchasers may choose just what they want. The unchanged, light alkaloid, extracted from belladonna (otherwise known as hyoscyamine), will be designated in trade as "Atropinum naturale" (melting at 106–108° C.); and the altered, heavy alkaloid, produced during the manufacture from the former, will be designated "Atropinum verum" (melting at 114–115° C.).

Experiments so far made with both alkaloids have shown them to act precisely alike, at least when used upon the eye. Regarding their action when taken internally, further trials are in progress.

Bismuth Peptonate.—This salt has a moderate circle of devotees, who use it with preference in cases of dyspepsia. A good quality of this compound should not have a dark color or a disagreeable odor.

Camphoric Acid, though not a new remedy, yet may be said to have been re-introduced recently, and is in considerable demand, being used internally, in doses of 15 to 30 grains, as a remedy for the night-sweats of consumptives. It is also used in diseases of the respiratory organs, in 1-per-cent alkaline solution, administered by inhalation.

Carbolic Acid.—This article has continued to be in lively demand. It appears that constantly increasing quantities of it are absorbed by manufacturers of picric acid for the use of high explosives in the interest of certain govern-

ments. The complaints about development of a red color in the acid have become less frequent, but have not altogether ceased. Lately it has been suggested that the red color is caused by traces of tarry coloring matters which assume a red tint on exposure to air. This theory seems to be supported by the fact that, when a vessel containing such reddened acid is dipped into hot water until the external layer is melted, and the liquid then poured off, the interior, still unmelted mass is entirely colorless.

Codeine.—Owing to the successful synthetic preparation of this alkaloid, its price has become quite stable, being about 2½ times that of muriate of morphine. It is curious that scarcely any attention is paid to the very easily soluble phosphate of codeine, while the much less soluble alkaloid continues to be in chief demand.

Caffeine.—It seems that the continental factories find it gradually necessary to discontinue the manufacture of caffeine, since English manufacturers, by reason of better advantages in obtaining the raw material (and freed from duty besides), are now able to undersell other makers.

Cotoin and true Coto Bark.—Genuine coto bark has for a long time been absent from the market. As no true cotoin could be prepared, the demand for it has almost ceased, para-cotoin (and para-coto bark) being used in place of it. Recently, however, an invoice of really genuine coto bark has reached Europe, but is held at an exorbitant price.

Ergotinine.—This alkaloid is being more largely used. It is administered hypodermically, best in form of the following solution:

Ergotinine	1½ grains.
Lactic Acid	3 grains.
Distilled Water	3¼ fl. oz.

Dose, hypodermically, 4 to 10 minims.

Ferri Lactas.—While this form of iron is in but slight demand in this country, it appears to be one of the most popular iron preparations in Germany.

Creosote.—Since the beneficial effects of creosote in phthisis have been more thoroughly recognized, its consumption has very much increased.

Since one of the constituents of creosote, viz., guajacol, has recently been recommended and used for the same purposes as creosote itself, there is a danger that creosote from which guajacol has been extracted ["deguajacolized creosote"] will be sold in the market. It is therefore quite proper that the pharmacopœial description and tests should be so modified as to take account of this. Among the proposed requirements are: a spec. grav. of 1.070, the formation of a difficultly soluble potassium salt upon the addition of caustic potassa, and the benzin test.

Eucalyptol.—The pure substance has a spec. grav. of 0.930, crystallizes at 0° C., and boils at 176–177° C.

Eucalyptol is a widely distributed principle. It has, so far, been discovered in the following oils:

Oils of	Source.	Discoverer.
Wormseed...	Artemisia Cina	Wallach & Brass.
Cajuput	Melaleuca Leucadendron	Wallach.
Eucalyptus ..	E. globulus.....	Jahns.
"	" amygdalina..... ...	Wallach & Gildemeister.
"	" Bayleyana..... ...	Schimmel & Co.
"	" microcorys	Schimmel & Co.
Rosemary...	Rosmarinus officinalis ..	Weber.
Spike.....	Lavandula Spica.... ...	Voiry.
Cheken	Myrtus Cheken	Weiss.
Myrtle.....	Myrtus communis	Jahns.
Camphor.....	Laurus Camphora.....	Schimmel & Co.

Hydroxylamine.—This substance, in form of hydrochlorate, is being successfully used as a substitute for chrysarobin, pyrogallic acid, anthrarobin, etc. It is commonly used in solution, in alcohol and glycerin, of the strength of 1 in 1,000 to 1 in 500.

Hyoscine.—The considerably reduced price of hyoscine will no doubt help its more rapid introduction as a sedative and hypnotic. Professor Kny, of Strassburg, has used the alkaloid in 3,000 cases among maniacal patients, and obtained from doses of ½ to 1 Mg. (1/120 to 1/60 of a grain), in 83 cases out of 100, a quiet sleep lasting 6 to 8 hours.

Iodine.—According to an agreement between the producers, the export of iodine from Iquique (Chili) to England, Germany, and United States was reduced from 175,680 kilos in 1886, to 77,196 kilos in 1887.

Myrtol.—The consumption of this proximate principle, recommended by Linarix as an antiseptic, has materially increased. Eichhorst used it in doses of 0.15 Gm. (2½ grains) repeated several times daily, as a disinfectant of the air-passages, with considerable success. According to Jahns, myrtol consists mainly of cineol. For this reason he recommends eucalyptol in place of myrtol, since the former consists likewise, in the main, of cineol.

Regarding myrtol, we take a few interesting notes from Schimmel & Co.'s report:

The first experiments (of Linarix and Delioux de Savignac, regarding the antiseptic action of myrtol) were made with oil of myrtle (from *Myrtus communis);* later on, however, myrtol was used, which is that portion of the oil which boils between 160 and 170° C. Hitherto the composition of this substance has been unknown. A recent investigation has shown the following results:

Oil of myrtle has a spec. grav. of 0.910 at 16° C., and is dextrogyre. Subjected to fractional distillation, the oil began to boil at 160° C. The distillate was caught in fractions from 10 to 10° C., and up to 240° C. about 80 per cent of the oil passed over. The residue consisted of partly resinified terpenes. The first fraction passes over at 158°–160° C., and is a dextrogyre terpen ($C_{10}H_{16}$) which is probably "dextrorotatory pinen."

The next fraction contains cineol (boiling at 176°C.). Besides these, there appears to be present a small amount of a camphor, which could, however, not be obtained in a pure state.

In its general character oil of myrtle agrees with that distilled from *Myrtus Cheken*, and is also related to oil of *Eucalyptus globulus.*

The so-called myrtol is a mixture of dextrogyre pinen and cineol, and should more properly be called "rectified oil of myrtle."

Jahns expresses the belief that the antiseptic action of myrtol is solely due to the cineol it contains. If this is so, there will be no danger of any scarcity of material. On the other hand, it would be impossible to procure the requisite quantities of myrtol.

Narceine.—The patented method of artificial preparation of narceine (by causing narcotine-methyl-chloride to act upon solution of caustic soda, and then warming with water) is likely to cause a decline in the price of this alkaloid.

Picrotoxin has been declared by Bokai to be a specific antidote for morphine, and may be used in place of atropine. He also thinks that it may, in many cases, be employed in place of the alkaloids of nux vomica.

Platinum.—The consumption of this metal has been nearly doubled during the last few years. Of course the price has also advanced. The principal consumers are Russia and the United States. In the latter, there are consumers requiring about 50 kilos (107 lbs.) every month. [We believe that a large portion of this is absorbed by manufacturers of electrical apparatus, another large portion by chemical factories, and the rest for small chemical apparatus and reagents.—ED. AM. DR.]

Oil of Anise.—To correct a misstatement or error made by some English writers (in *Pharm. Journ.*, to which we have already alluded in a previous issue) regarding the relative quantity of oil of star anise and oil of Pimpinella anisum, Messrs. Schimmel & Co. state that they work up, under normal conditions, about 7,000 kilos of anise seed *daily.* From October, 1887, to May, 1888, they worked up 800,000 kilos, obtaining therefrom 24,000 kilos of oil of anise. [In this country it is, however, well known that when "oil of anise," without further specification, is ordered from a dealer, the oil of star anise is usually supplied.—ED. AM. DR.]

Oil of Bay.—Bay rum, for many years one of the most popular toilet articles in this country, had been but little used in Europe until a few years ago. It has, however, at last captured the favor of the European public, and both the genuine and imitations are in vogue. The manufacturers of and dealers in oil of bay of course supply their customers with recipes for making artificial bay rum. Some of these are very good; others are, to say the least, of doubtful character. In their last report, Schimmel & Co. quote two recipes from "Hamlin's Formulæ," the first of which may be acceptable, while the second appears to us to be rather eccentric:

I.

Oil of Bay	2 drachms.
Oil of Pimenta	1 drachm.
Oil of Cloves	10 drops.
Alcohol	½ gallon.
Water	½ "

Mix, allow to stand several days, and filter.

II.

Oil of Bay	1 oz.
Alcohol	½ gallon.
Jamaica Rum, best	1 "

Mix the oil and alcohol, allow to stand two weeks, then add the rum.

Oil of Cedarwood.—It may be of interest to microscopists that Schimmel & Co. have succeeded in preparing an *inspissated* oil of cedarwood which relieves the user from the disagreeable task of concentrating the commercial oil himself. It has about the consistence of castor oil and a light Rhine-wine color. It has been so far impossible to obtain it colorless.

Oil of Bergamot.—The question of what should be the natural color of oil of bergamot has, of late, been repeatedly a subject of discussion. Schimmel & Co. have obtained on this subject reports from two of the most trustworthy manufacturers in Reggio.

One of these states that the freshly prepared oil has a *brownish-yellow* color. A certain proportion of it, indeed, has a greenish tint, but this is the case only when the oil is prepared from unripe fruit. This is seldom put on the market, but is usually mixed with that which is prepared from ripe fruit. If this "greenish" variety is examined in a glass tube, its tint is more properly called "yellow-

ish." The emerald-green oil exported from Messina derives its tint from badly tinned copper vessels (estagnons).

The other manufacturer states that the freshly prepared oil of bergamot has the *color of honey*, and that this kind is preferred by purchasers. A green color is produced when the oil is kept for some time (seven or eight months) in tinned copper vessels. It gradually corrodes the tinning, and then absorbs copper.

Oil of Orris.—It is well known that the largest portion of this substance, as now put on the market, consists of myristic acid carried over by distillation, and this holds the aromatic oil. Schimmel & Co. announce that they will eventually also put the pure oil among their products. But this will be a very expensive article, the price or cost of which will likely be equal to an equal weight of gold.

Oil of Peppermint.—According to carefully collected statistics, Schimmel & Co. estimate the production of oil of peppermint in all countries during the year 1888 to have been as follows:

United States, New York	ab.	35,000 kilos.
" " Michigan	"	27,000 "
England, Mitcham	"	5,000 "
" Cambridge and Lincolnshire,	"	1,400 "
Japan		64,000 "
Italy		1,200 "
France		4,600 "
Germany		400 "
Russia		? "
Total, about		138,000

Oil of Rose.—Schimmel & Co. give some valuable information regarding the constituents and properties of genuine oil of rose, and the best methods of detecting adulterations:

I. Isolation and Determination of the Stearopten.

Warm 50 Gm. of the oil with 500 Gm. of 75 per cent alcohol to a temperature between 70 and 80° C. On cooling to 0° C., the stearopten is almost completely separated. Remove it from the liquid portion, treat it with 200 Gm. of 75 per cent alcohol, and continue to repeat this until the stearopten is completely odorless. Two treatments of the crude stearopten are usually sufficient.

Schimmel & Co. found, in this manner, the following quantities of stearopten:

1.	Rose Oil, German, 1887:	32½	per cent.
2.	" " " 1888:	34	"
3.	" " Turkish, 1887:	12–13	"
4.	" " " 1888:	14	"

II. Determination of Spermaceti (if present) in the Stearopten.

Boil 3–5 Gm. of the stearopten during 5 or 6 hours, with 20–25 Gm. of alcoholic solution of potassa (5 per cent), under an upright condenser, evaporate the alcohol, and add hot water to the residue. On cooling, the larger portion of the stearopten will separate and float upon the surface as a firm, crystalline mass. Pour off the alkaline liquid, wash the stearopten with a little cold water, then melt it in hot water, allow to cool again, pour off the liquid, and continue melting and washing until the wash-water is neutral. Unite the aqueous liquids, and agitate it twice with ether in order to extract any stearopten suspended in it. Separate the alkaline liquid from the ether, acidulate it with dilute sulphuric acid, and again agitate it with ether. On evaporating this, it should leave no residue (abs. of fatty acids). By way of control, the stearopten, dried at 90° C., may be weighed, including in it, of course, also that portion which had been shaken out by ether from the alkaline liquid. The quantity found will always be a trifle short, since a small amount volatilizes on drying. The loss was found to be about 1 per cent.

To verify the accuracy of this test, 57 Gm. of Turkish oil of rose (1888) were purposely adulterated with 1 Gm. of spermaceti, and the product treated by the before-mentioned process. The 58 Gm. of mixture yielded 9.55 Gm. of stearopten = 16 per cent; 3.07 Gm. of this stearopten yielded 2.89 Gm. of recovered stearopten and cetylic alcohol. Loss 0.18 Gm. The amount of fatty acids obtained was 0.155 Gm., corresponding to 0.291 Gm. of spermaceti. The original mixture contained 1.7 per cent of the adulterant, and 1.5 per cent was discovered by the test.

Following are the melting points of rose-oil stearopten:

	C.
From German Oil, 1887:	36–36.5°
" " " 1888:	35–35.5°
" Turkish " 1887:	34–35°
" " " 1888:	33 5–34°
" " " 1888 with addition of 1.7 per cent of spermaceti:	31.5–32°

Rose oil thus deprived of its stearopten (or nearly all of it) remains liquid when cooled to 0° C. At a lower temperature, however, it becomes gelatinous, owing to the fact that it still contains some stearopten.

The fluid portion of rose oil has a most exquisite, powerful odor. When dissolved in alcohol it does not yield the disagreeable crystalline flakes so annoying when preparing perfumes. For these reasons Schimmel & Co. have introduced the purified oil (free from the odorless stearopten) on the market.

Oxynaphthoic Acid has been occasionally employed as an antiseptic, in form of one-per-cent solution in collodion, and as 1 per cent cotton. In veterinary practice it has been successfully used against scabies.

Petrolatum and Vaseline.—The German manufacturers of vaseline have petitioned Government to permit the duty-free importation of foreign material for the manufacture of petroleum ointment (vaseline, petrolatum, etc.), since the present duty makes it difficult for the German manufacturers to compete with foreign ones. [If this petition is granted, which is not improbable, the export of petroleum ointment from this country will no doubt suffer a considerable reduction.—ED. AM. DR.]

Strophanthus.—The seeds are still in good demand. There were new arrivals of *Strophanthus Kombé*, which has a greenish hairy appendage, and is the variety of species upon which the recorded therapeutic effects are really based. The brownish-haired seeds of *S. hispidus*, of which there are also invoices in the market, do not seem to be able to find purchasers.

Sulphonal.—This hypnotic is being consumed in very considerable and increasing amount. It seems destined to displace paraldehyde, amylene hydrate, etc., and is likely even to make inroads upon the consumption of morphine and chloral. Nevertheless, as long as the price is kept high, its use is likely to be restricted to those persons who are better able to afford its purchase, particularly as it takes at least fifteen grains to produce sleep.

Gehe & Co. think that the reported negative results (which are stated to amount to about ten per cent of all cases) will be materially reduced in number if the remedy is administered in the form of powder.

Thiol.—Thiol (Latinized: Thiolum) has made its appearance as a rival of ichthyol. It is produced, after a patented process, from coal-tar (obtained from brown coal or lignite) by treatment with sulphur and sulphuric acid.

Mercury Mines.

THE quicksilver mine at Almaden, in Spain, is said to have been discovered 400 years B.C. For twenty-two centuries it has been in course of development, always paying a profit, though its production previous to the fifteenth century was comparatively small. Up to that time mercury was principally used for the making of vermilion, but in 1557 its property of amalgamating with the precious metals was discovered, and this created a largely increased demand. The Almaden mine is the most perfect deposit of cinnabar, or perhaps of any other metal, ever discovered; consisting of three parallel veins about 100 feet equidistant, penetrating the earth almost perpendicularly, growing richer and wider in metal as they descend, the deposit at 1,000 feet depth being richer than at any point above. For the last twelve years the average yield of mercury in the ore has been 9 per cent, for the last two years 10.50 per cent. The Idria mine, in southern Austria, was discovered at the close of the fifteenth century. Next to the Almaden, this is the richest mine now worked, the bottom of the lode showing no diminution either in the quantity or quality of yield. Its reserves of ore are estimated to be equal to 900,000 flasks. The New Almaden mine in America is situated about thirteen miles from San José, California, at an elevation of 1,700 feet above the sea, in a low range of hills. The quicksilver deposits of California are characterized by a great and persistent irregularity, so that it makes the mining of these ores much more difficult than that of other metals. It has often occurred in the history of the mine that there was no ore in sight, and it looked as though the works must be shut down, and it has only been by the most careful prospecting that it has been possible to keep up the production. Very frequently large bodies of ore will almost completely run out, and there will be visible in the face of the works only a slight coloration in the vein matter which indicates that there is any more left in that particular place, and by following out this little string of ore very carefully it may lead into a large deposit. From the commencement of the working of this mine up to 1870 the results were very unsatisfactory, and in the year named it seemed as if the company, which had in the meantime contracted an indebtedness of about £300,000, would collapse, but by a supreme effort another £40,000 was raised, and the expenditure of this led to the discovery of paying deposits.—*Chem. and Drugg.*

Bisulphide of Carbon as an Internal Remedy.—Bisulphide of carbon has been used with apparent advantage in typhoid fever, and has been recommended in diphtheria and other diseases in which micro-organisms occur. Cases of acute and chronic dysentery, of atonic dyspepsia, of simple gastric ulcer, and of typhoid fever have also been treated successfully with it. The dose given was generally about 2 oz. of a saturated solution of the bisulphide in water mixed with milk or a little syrup, taken half an hour or so before meals. In typhoid, enemas of a pint of water, containing about ½ drachm of the bisulphide, were given in addition to the internal administration of iodide of potassium and kairin. The diarrhœa diminished, and the patient made a good recovery.

Notes on New Remedies.

Hydrocinnamic Acid (Acidum hydrocinnamicum).

Synonyms: homo-toluic, or benzyl-acetic, or beta-phenyl-propionic acid. $C_9H_{10}O_2$(=$C_6H_5.CH_2.CH_2.COOH$).

Acicular, reddish-white crystals, but slightly soluble in water, soluble in 6 parts of alcohol. The alcoholic solution has a pleasant acidulous taste and an aromatic odor which diffuses itself through the surrounding atmosphere.

Drs. Klein and Lingard report that they have used this substance with success in the destruction of the *bacillus tuberculosis*. Dr. Williams subsequently also tried the remedy in *alcoholic solution*, beginning with a dose of 10 minims in an ounce of water, increasing generally to 20 minims in 2 oz. These doses were given two or three times daily. Thirteen out of 20 phthisical patients, treated with the remedy from 28 to 85 days, manifested a decided improvement (*Practitioner*, 1889, Feb., p. 100).

The acid seems to act not so much on the tubercular process as upon the purulent process. No increase of expectoration or cough took place in any case.

Colchicine.—Darier recommends this alkaloid in marginal ulceration of the cornea when of *gouty* origin; also in several other affections of the eye. [We mention this chiefly on account of the caution necessary in administering the remedy, colchicine being a dangerous drug.] Darier orders *pills* containing $\frac{1}{65}$ grain of colchicine each, of which he administers *daily* 1 or 2 or 4, never over 6. The dosing is to be reduced (but not entirely suspended) whenever colic or gastric spasms occur. The treatment must be continued in unbroken sequence.

Mercury-Betanaphthol Acetate.—This has been recommended by Bombelon as an excellent substitute for corrosive sublimate and for iodoform in the dressing of wounds.

It is an amorphous, rather heavy, white powder, insoluble in the usual menstrua. It is applied in form of highly diluted powder:

Mercury-Betanaphthol Acetate	1 part.
Kieselguhr	enough to make 200 parts.

[Kieselguhr is a fossil siliceous earth, found in Europe and in this country, used, among other purposes, for absorbing nitroglycerin in making dynamite. The so-called "electro-silicon," used as a polishing material, is a very pure form of kieselguhr.—ED. AM. DR.]

Or gauze is impregnated with it. Or it is triturated with fresh albumen, and the mixture shaken with water, so as to produce an emulsion.

The remedy is also recommended internally, in syphilis and in abdominal typhus, in doses of ¾ grain several times daily.

Morrhuol [of which we had occasion to speak several times before] is now easily available in the market, and is highly spoken of as an "extract of cod-liver oil," "forming the most eligible substitute" for the latter. Lafarge and Germain-See report favorably on it from the experiments in the Paris hospitals.

Morrhuol appears as a brownish-yellow, oily liquid, from which, at ordinary temperatures, a portion crystallizes out. Its odor resembles the oil itself. Hence it is best given in gelatin capsules containing about 3 grains of morrhuol each. This corresponds to about 1¼ fluidrachms of the oil itself.—Chiefly after *Merck's Bulletin*, April, 1889.

Thiol.

THE success of ichthyol in the treatment of rheumatism and certain skin diseases has encouraged researches to synthetically obtain a substance identical with it in composition and action. After laborious preparatory work, Dr. Jacobsen has succeeded in obtaining such a product, which he calls thiol, from "theion" (sulphur). He found that while saturated hydrocarbons do not take up sulphur, considerable quantities of this substance may be added to non-saturated hydrocarbons. On this circumstance he bases his patented process, according to which so-called gas-oil is heated in an oil-bath to a temperature of 215° C., 10 per cent of flowers of sulphur being gradually added meanwhile. This process yields a crude thiol oil, which has now to undergo sulphurization, effected by the addition of an equal quantity of pure concentrated cold sulphuric acid. The result is thiol-sulphuric acid, which is identical with ichthyol. It forms compounds with soda and ammonia, equal in every respect to the salts of ichthyol. It is claimed that thiol compares favorably with ichthyol in being inodorous, easily pulverized, and cheaper. Its therapeutic action has been studied by Drs. Reeps and Buzzi, both of Berlin. They declare it to have the same therapeutic effects as ichthyol. Thiol is a dark-brown fluid of syrupy consistency, and is also to be obtained in the shape of a fine powder, prepared from the fluid by evaporation. Thiol may be dispensed as an ointment in combination with vaseline (℥ i.), lanolin (℥ i.), with thiol ℥ i.; to make a dusting-powder, 1 drachm of thiol may be combined with 2 drachms of oxide of zinc, 1 drachm of powdered starch, and 2 oz. French chalk. For internal administration the dried thiol is combined as a pill with licorice powder and glycerin of tragacanth. The dose is about 2 grains.—*Chem. and Drugg.*

American Ozokerite.

A COMPANY has been formed, under the laws of New York State, to develop large deposits of ozokerite, a natural paraffin wax existing in the Wasatch Mountains of Utah Territory, about 113 miles east of Salt Lake City. These mines are said to contain the only deposits of this mineral known to exist outside of Galicia, Austria, whence the entire world's supply of this product has, until recently, been obtained. The uses of this mineral are constantly enlarging, and in this country alone the consumption amounts to 500 tons yearly. The price of refined ozokerite, commercially known as ceresin, ranges from 20c. per lb. for chemically pure white down to 6c. per lb. for crude black of a poor quality. The company proposes to mine 1,500 tons of wax yearly, and pay 7 per cent on a capital stock of $1,250,000. The first shipment from the American mines arrived in New York in January this year and attracted considerable comment.—*Eng. and Min. J.*

Platinum in Canada.

A NOTEWORTHY discovery has been lately made. Platinum has been found *in place* in the nickeliferous ore of Sudbury, Canada, by Professor F. W. Clarke. This discovery was made accidentally in the course of determinative and analytical work upon the ore, which presents other peculiarities. While the amount found is of little or no commercial importance, it has a very great scientific significance, and is certainly something new. Platinum grains have been found in secondary rocks, such as recent sandstones, conglomerates, etc., but never before, so far as we are aware, in vein stuff, although it has long been looked for, and such an occurrence was to be expected. There is, therefore, always the chance that actual mines of platinum-bearing material, so often falsely reported, may actually be found, and that perhaps some of them may be of a paying grade. The number of localities and their wide distribution in this country point to such an outcome.

Exalgine.

EXALGINE is the name of the latest candidate for medical favor as a pain reliever. Drs. Dujardin-Beaumetz and Bardet have experimented with it, and found it in some respects preferable to antipyrin. To facilitate its use in prescriptions, they have given it the shorter name just mentioned, as more manageable than its full chemical appellation orthomethylacetanilide.—*Chem. and Drugg.*

Some doubt seems to have arisen as to the identity of exalgine on account of its description as *ortho*-methyl-acetanilide, as distinct from the meta- and para-isomeric compounds. In a communication to the Academy of Sciences (*Compt. Rend.*, Ap. 8, pg. 749) Mr. Giraud says: "The name *ortho*-methylacetanilide can be applied to but one substance, described by Beilstein and Kuhlberg under the name aceto-ortho-toluid, and prepared by means of orthotoluidine and acetic acid. The substance prepared by Mr. Brigonnet is not new; it was described by Hofmann in 1874. Its true designation is methylacetanilide, and it cannot exist under three modifications, for the phenyl radical contained in its molecule is not substituted. This substance is utilized in laboratories for the preparation of monomethylaniline, and is manufactured on a large scale and at a low price."—*Ph. Journ.*

Strophanthin.

HARDY and GALLOIS' method of preparing strophanthin is defective, inasmuch they employ alcohol acidified with hydrochloric acid, and consequently destroy the greater part of the strophanthin. Mr. Arnaud employs the following method: Finely powdered strophanthin seeds are exhausted by boiling with 70 per cent alcohol in an apparatus with reflux condenser for some hours. The greater part of the alcohol is then distilled from the extract over a water-bath, but the evaporation is continued in vacuo, leaving some liquid, which is cooled and, after removing the floating oil and resin, is filtered. The filtered liquid is heated in a water-bath, mixed with a small quantity of basic lead acetate and finely powdered litharge, and filtered again. Any lead in solution is removed by hydrogen sulphide. The clear liquid is then concentrated in a drying chamber at 50° C. In a day or so the strophanthin crystallizes out, and is filtered off, keeping the temperature at 50°. If the concentration has not been carried too far, the syrupy liquid runs off gradually, and the crystals have simply to be drained on a porcelain slab and recrystallized several times from boiling water. In this manner 4.5 Gm. of the crystalline strophanthin is obtained from each kilo. of seed of *Strophanthus Kombé*, but some strophanthin is retained by the syrup.

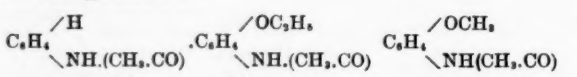
Strophanthin, $C_{31}H_{46}O_{12}$, is a white, very bitter substance, crystallizing in radiating spangles. These crystals soak up and retain water with great facility. Strophanthin forms a hydrate, which parts with its water in a dry vacuum or when dried in the air; if heated in a drying chamber, it melts below 100° and becomes colloidal, but

when previously dried in a vacuum it can be heated to 110° without alteration. When strophanthin is heated in the air, it burns without leaving a residue. It becomes pasty at 165°, losing its opacity and becoming brown with moderate rapidity. It is dextrogyrate, and with a 2.3 per cent aqueous solution the deviation, with sodium light, is +30°. It is scarcely soluble in cold water, one part requiring 43 of water at 18°; it is moderately soluble in alcohol, from which it is deposited as a varnish. It is insoluble in ether, benzene, and carbon bisulphide. Tannin precipitates it from the aqueous solutions.

From its composition it appears to be the homologue of ouabaïne, $C_{30}H_{46}O_{12}$, which it resembles in poisonous properties. Both, when heated with diluted acids, decompose like glucosides, yielding a body which reduces Fehling's solution, but does not appear to be glucose.—*Compt. Rend.* and *J. Soc. Chem. Ind.*

Methacetin.

METHACETIN is another new antipyretic. According to its chemical composition, its full name should be acet-para-anisidin. Similar to phenacetin, or acet-para-phenetidin, it is derived from amido-phenol. The relation of these compounds with antifebrin (acetanilid) is shown by the following formulæ:



Acetanilid (antifebrin). Phenacetin. Methacetin.

Methacetin, as used in Mahnert's experiments, is a slightly reddish, odorless powder of saltish, bitter taste. The powder is composed of the fine crystalline scales, which melt at a temperature of 127° C. It is soluble in cold water, more so in warm water, and still more in alcohol. So far the new remedy has been only administered in febrile diseases of children. The abatement of temperature was gradual, and lasted for some hours. Perspiration was copious. In one case collapse set in; otherwise no disagreeable after-effects were observed. The dose for children was 3 to 5 grains.—*Chem. and Drugg.*

Animal Arrow Poison.

MOST of the arrow poisons of Africa hitherto known have been of vegetable origin; indeed, all the famous poisons are of this nature. Mr. H. M. Stanley has added one poison to the list which does not appear to be a product of the vegetable kingdom. In the Lower Congo district Mr. Stanley's force was assailed by a tribe of dwarfs, who used poisoned arrows. Five members of the expedition were hit by these arrows, four (black men) dying very shortly after, their sufferings having been intense. The fifth man—Lieut. Stairs—had a narrow escape. The poison of the arrow which hit him had been dry, and so he did not experience the full toxicity of the barb. It was afterwards found that the poison is manufactured from the dried bodies of red ants, or pismires, ground into powder, cooked in palm oil, and smeared over the wooden points of the arrows. What is the nature of the poison which causes death? The *Lancet* says it is formic acid, which exists in the free state in red ants, and is, in the pure state, so corrosive that it produces blisters on the skin; hence there is little ground, says our contemporary, for doubting that it was the "deadly irritant by which so many men had been lost with such terrible suffering." The multitude of curious insects encountered, which rendered their lives "as miserable as they could well be," bears out Mr. Stanley's idea that many similar poisons could be prepared from insects. It certainly is strange that, with the exception of cantharides, and perhaps of blatta orientalis, the insect world is so little used for active therapeutics. Not forgetting the fact that homœopaths have long had that respect for the insect kingdom which the *Lancet* desires, we may mention that ptomaïnes as a source of toxicity are more likely than formic acid to have produced the paralytic symptoms which were exhibited by the dying men.—*Chem. and Drugg.*

Note by Ed. Am. Drugg.—That ptomaïnes are at the bottom of the toxic effect of this animal poison there can scarcely be any doubt. The poisonousness of decomposing or decomposed animal matter was already known to the ancients, and many deaths, no doubt, have been caused, both accidentally and intentionally, by ptomaïnes. Professor Edward Schaer, of Zurich, some years ago, published an extensive paper on this subject, which reviews the records of literature relating to it.

Castor Oil vs. Olive Oil as Lubricator.—The Italian Admiralty have recently caused to be carried out a number of experiments with a view to testing the comparative merits of castor oil and olive oil for lubricating purposes on board ship. From the results obtained, they have given orders that henceforth all exposed parts of machinery are to be lubricated exclusively with castor oil, while mineral oils are to be used for cylinder and similar lubrication.—*J. S. Chem. Ind.*

Use of Hydrogen Peroxide in Analysis.

LEAD peroxide may be most readily dissolved by treatment with dilute nitric acid and a solution of hydrogen peroxide. Half of the oxygen from each of the two peroxides unite to produce an effervescence of oxygen, even when cold, resulting in the formation of lead nitrate.

A similar action of hydrogen peroxide I have frequently found of advantage in effecting the solution of a precipitate produced by ammonia and consisting mainly of ferric and alumina hydrates, in which, however, after washing, a little manganese is retained as Mn_2O_3. The latter body will resist solution in dilute acid, and under these circumstances a drop or two of hydrogen peroxide will instantly clear up the solution.

In the same manner ignited oxide of cerium or oxide of manganese may be readily dissolved by cold dilute acids mixed with hydrogen peroxide.—F. P. DUNNINGTON in *Journ. Anal. Chem.*

Color Test for Strychnine.

FLÜCKIGER (*Pharm. Zeitung*) proposes the following solution for testing strychnine: 0.01 Gm. of potassium dichromate is dissolved in 5 C.c. of water and mixed with 15 Gm. (8.15 C.c.) of sulphuric acid of sp. gr. 1.84 at 15°. When cold, the reagent is ready for use. A solid body to be tested for strychnine is moistened with a single drop of this liquid, or the powdered solid is scattered upon the liquid on a porcelain slab, or a saturated solution of the strychnine salt is let flow slowly over the acid, shaking very gently, so as to obtain a distinct zone. Certain substances, such as brucine, give a fine red color with the chromiferous sulphuric acid, and mask the reaction of strychnine. In case of a mixture of brucine and strychnine which does not at once give the strychnine reaction, the substance is placed upon a small moistened filter, and chlorine water is dropped upon it as long as a red color is thus produced. Dichlor-brucine is thus formed as an amorphous, easily soluble body, which passes rapidly into solution. The undissolved alkaloidal residue gives the reaction of pure strychnine.—*Chem. and Drugg.*

Detection of Very Small Quantities of Arsenic.

PROF. FLÜCKIGER finds that a concentrated solution of silver nitrate makes a very delicate test for arsenic, forming the yellow compound $AsAg_3+3AgNO_3$ with arseniuretted hydrogen. As small an amount as $\frac{1}{1000}$ Mg. of As_2O_3 has been detected in this way.

A solution of *mercuric chloride*, when acted upon by arseniuretted hydrogen, gives almost as sharp a reaction. When this solution is absorbed by blotting paper and exposed to arseniuretted hydrogen, a yellow stain is produced at first, which gradually changes to a brown. Zinc and hydrochloric or sulphuric acid are better for producing hydrogen than sodium amalgam, but the zinc must be entirely free from sulphur, arsenic, phosphorus, and antimony, so that when 10 Gms. of the metal are dissolved in dilute hydrochloric acid, the silver nitrate or mercuric chloride paper remains unchanged after being exposed to the gas for two hours, care being taken not to expose the silver nitrate paper to the light. The mercuric chloride solution is more convenient than the silver nitrate solution, since it is not affected by light.—Abst. f. *Arch. d. Ph.* in *J. Anal. Chem.*

Tests for Tannic and Gallic Acids.

WHEN ammonium chloride and ammonia are added to solutions of tannic acid, a white precipitate is formed, which rapidly becomes red. In solutions containing 1 part of tannic acid in 5,000 of water, the precipitation is slow, and it is best to drop in the ammonium chloride so as to form a layer on the top, then at the point of contact a distinct white line appears, even in solutions containing 1 in 20,000, whilst by holding against a black surface 1 in 50,000 may be detected. When solutions of gallic acid are treated in a similar manner, no precipitation occurs, but the liquid becomes red in strong solutions, and with dilute solutions a greenish-colored ring forms, even when the dilution is 1 in 100,000. A red coloration is produced in solutions of either of these acids by chlorine water and ammonia, and by potassium ferricyanide and ammonia. With the latter reagents a 1-in-10,000 solution of tannic acid becomes distinctly red, and the redness produced in a 1-in-30,000 solution is seen by looking down the test through the column of liquid, whilst, by comparing with a blank, a yellowish-brown coloration may be detected in a 1-in-100,000 solution.—S. G. RAWSON (Abstract in *J. Chem. Soc.* from *Chem. News*).

New Test for Copper.

M. DENIGÈS, of the Bordeaux Faculty of Medicine and Pharmacy, has recommended the following process: Place in a test tube 2 C.c. of a cold saturated solution of potassium of bromide, and add 1 C.c. of concentrated sulphuric acid. At first the mixture will turn to a light yellow near the acid, but, on shaking, it will become colorless again, provided the bromide be free from bromate. Now two or three drops of the liquor under examination

are added, and if it contains even traces only of copper a carmine-red coloration will develop, becoming brighter on heating, and disappearing when water is added. The same reaction will take place even with copper salts in the solid state. A few precautions, however, are useful. For instance, the solution to be tested for copper should be previously acidulated with sulphuric acid, to separate insoluble sulphates, and avoid cloudiness during the colored reaction. It is a good plan, also, to prepare beforehand the reagent by adding to a saturated solution of potassium bromide half its volume of sulphuric acid, free from nitrous compounds, and filtering afterwards through asbestos to separate out the potassic sulphate. The presence of either nickel or cobalt will not affect the accuracy of the process.—*Chem. and Drugg.*

Estimation of Albumen in Urine.

THIS new method is considered more accurate than Esbach's. The latter plan consists merely in the complete precipitation of the albumen by picric acid, and the use of a tube so graduated that the depth of the deposit at the end of 24 hours indicates so many Gm. of albumen per liter of urine. This was found to be variable in its results when compared with those of coagulation by heat and nitric acid, for very slight changes of temperature influence the extent to which the precipitated albumen will "settle." The new method proposed consists in the use of tannic acid as the precipitant, and the suspension of the precipitate in the urine by means of mucilage. This mixture is then, after being diluted with water, poured into a vessel of certain capacity, which is placed over a white surface on which black lines are drawn. The amount of the "emulsified" urine necessary to obscure the lines will be in the inverse ratio to the quantity of albumen in the urine—a quantity easily estimated by the employment of a suitably graduated burette. The principle is the same as that introduced by Panum for the determination of the quantity of cream in milk, and can no doubt be made available for clinical work. The results obtained are given in tables, but, so far as can be gathered from these, the advantage of the plan over that of Esbach (a far simpler method) does not seem very great; neither plan is quite accurate.—A. CHRISTENSEN (Abstract *J. Chem. Soc.*).

Note on Clarke's Soap Test.

WHEN a standard soap solution is run into a solution of a calcium salt till a lather is formed, as for instance in determining hardness in water, it is commonly taken for granted that each equivalent of lime destroys an equivalent of soap.

Put in an equational form in the case of calcium sulphate and sodium oleate—

$$CaSO_4 + 2NaC_{18}N_{33}O_2 = Ca(C_{18}N_{33}O_2)_2 + Na_2SO_4$$

I find that an equivalent of lime requires 1½ equivalents of soap, or $CaSO_4$ requires $2\frac{2}{3}NaC_{18}H_{33}O_2$.

In the case of magnesium salts the reading is rather more obscure, but an equivalent of magnesia requires rather more soap.

As the mean of many experiments I find that an equivalent of magnesia requires 1½ equivalents of soap, or $MgSO_4$ requires $3NaC_{18}H_{33}O_2$.

I obtained these results both with oleic acid and with the solid fatty acids (commercial stearic acid).

Mr. Wanklyn's statement in his "Water Analysis," that magnesium requires 1½ times as much soap as calcium, is well known to be incorrect, but it is probably based on the observation that magnesium requires 1½ times as much soap as theory indicates, coupled with the erroneous assumption that calcium requires only its theoretical quantity.

It is a pleasing thing for soap consumers to find that a grain of chalk or magnesia in a water-supply destroys 1½ or 1½ times as much soap respectively as has been hitherto thought.—FRANK L. TEED (abstract), in *J. Soc. Chem. Ind.*

Volumetric Determination of Sulphates.

THE following method is proposed in the *Bulletin Soc. Chem.*, Paris: A solution of barium chromate is made by dissolving in 200 C.c. of distilled water 19.48 Gm. of neutral potassium chromate and 50 to 100 C.c. of pure hydrochloric acid, and there is poured in slowly, stirring to dissolve the precipitate formed, 24.35 Gm. barium chloride previously dissolved. Then make up to 1 liter, and filter. Of this solution, 50 C.c. precipitate from 0.3 to 0.4 of sulphuric acid. The excess of alkaline chromate involves a deduction as correction in all the readings. This correction may be determined once for all by precipitating in a flask marked at 1,000 C.c. 100 C.c. of the solution with an excess of ammonia, and reducing with the ferrous liquid 100 C.c. of the filtrate mixed with 5 C.c. of pure sulphuric acid. The ferrous liquid is prepared by dissolving 20 Gm. double iron and ammonium sulphate and 10 C.c. of pure sulphuric acid in 1 liter of water. The operation is conducted as follows: One Gm. pure dry potassium sulphate is dissolved in 600 C.c. of water in a flask marked at 1 liter, 100 C.c. of the barium chromate are added and shaken up. When the liquid begins to grow clear, it is supersaturated with ammonia, when the liquid becomes of a sulphur yellow. It is filtered, and 100 C.c. of the perfectly clear liquid are taken, and to them are added 5 C.c. of pure sulphuric acid. The solution of iron is dropped in from a burette holding 50 C.c. The liquid turns from red to olive-brown green, and at last bluish-green. At this moment little drops of the liquid are taken up with a glass rod and placed upon drops of ferricyanide on a white slab, stopping as soon as there is a blue tint. The solution of ferricyanide must be fresh, and so dilute as to appear colorless. The salt must not be used as a dry powder. The actual determination is performed in the same way. Chlorides and nitrates do not interfere; chlorates must not be present, and phosphates must be previously eliminated.—*Chem. and Drug.* and *Chem. News.*

Determination of Lithium by Means of Fluorides.

THE reagent which A. Carnot has recently proposed is ammonium fluoride. It is found in commerce, but it requires to be purified, as it contains silico-fluoride in considerable quantity. For this purpose a few Gm. of the salt are dissolved in a small volume of water, a double volume of ammonia is added, the mixture is heated to a boil for a few seconds, let cool, filtered, and washed with ammonia. The silica is thus eliminated, and we have the fluoride in a strong ammoniacal solution. It is kept either in a covered platinum crucible or in a stoppered glass, where it may be left some days without undergoing any change. If there are in solution at most some decigm. of a lithium salt, with quantities of other alkaline salts not more than ten or fifteen times greater, the author proceeds as follows: The solution is reduced to a few C.c. in a tared platinum capsule, ammonium fluoride is added and an excess of ammonia up to 15 to 20 C.c., according to the quantity of the salts. It is well mixed and let settle. There is formed a white, gelatinous precipitate of lithium fluoride, scarcely visible, and adhering in part to the bottom of the capsule. This is complete by the next morning. Almost all the liquid is decanted through a very small filter and replaced by a few C.c. of ammonia water with ammonium fluoride. It is stirred up with a platinum spatula and let settle. Soon after a second and a third decantation are made in the same manner, and the filter is washed with a few drops of the same reagent. All the soluble alkaline salts are thus removed, and we have, in part on the filter and in part in the capsule, all the lithium salt contaminated merely with ammonia and ammonium fluoride.

The volatile matters are expelled by heating very gently, the filter is burnt, its ash is treated with a few drops of dilute sulphuric acid, and all the liquid is collected in the tared capsule. It is evaporated and gently heated until acid vapors cease to appear, and the neutral lithium sulphate is weighed.

To take account of the solubility of lithium fluoride in the ammoniacal liquid, we measure the total volume of the filtrate, which generally ranges from 30 to 50 C.c. We may admit, in accordance with experiments, that 7 C.c. of the liquid contain approximately 2 milligms. lithium fluoride, corresponding to 4 milligms. lithium sulphate or 1 milligm. lithia. The quantity thus calculated is added to that found on weighing.—*Bull. Soc. Chim.* and *Chem. News.*

The Use of Bromine for the Estimation of the Cinchona Alkaloids.

AT the annual meeting of the Chemists' Assistants' Association, held at London on May 2d, Mr. W. T. Fawssett read the following paper on this subject, for which he was awarded a prize by the Association. We take the paper from the *Pharm. Journal:*

The observation that a solution of sulphate of quinine required considerably more bromine water to produce in it a permanent yellow tint than a similar solution of sulphate of cinchonidine suggested the employment of this reaction as a means for estimating the cinchona alkaloids.

The investigations of Laurent, Anderson, Cahours and Etard, Bloram, Jackson, and Eiloart have shown: (1) That bromine is capable of combining with alkaloids to form bromo-derivatives; (2) That the alkaloids differ in the amount of bromine with which they can combine; (3) That the amount of bromine absorbed depends on the physical conditions (temperature, solution, etc.) of the substances.

With a view to insuring the constancy of these conditions, the following process has been devised: One Gm. of the alkaloid or alkaloidal salt is dissolved in just sufficient dilute sulphuric acid, and the solution is diluted with water to 600 cubic centimeters in a cylindrical vessel. The temperature of the solution must not be much below 60° F. It is now titrated with bromine water, contained in a burette provided with a well-fitting float, the first 10 C.c. of which have immediately before been estimated in the usual way. The bromine water is run in in quantities of 5 C.c. (the color being allowed to disappear after each addition) until a permanent yellow tint is

produced. The excess of bromine is estimated colorimetrically by running the bromine water into a vessel of the same dimensions and containing an equal quantity of pure water till an identical tint is obtained. From this the actual amount of bromine decolorized by the alkaloid is readily calculated.

A series of experiments were made with the object of ascertaining the number of atoms of bromine absorbed by a molecule of each alkaloid. It was found that a molecule of quinine, quinidine, and cupreine each absorbed approximately 6 atoms of bromine; hydroquinine, 4 atoms; and cinchonidine, cinchonine, and amorphous quinine, each 2 atoms. The figures obtained were only approximately correct, commercial alkaloids having been employed. In order to confirm the results with pure alkaloids, the quinine and cinchonidine were submitted to processes of purification, and it was then found that their bromine absorption equivalents exactly corresponded with those given above. A correction was made for the impurities found in the hydroquinine, with the result that the bromine absorption equivalent of that alkaloid was also considered to be correct.

The behavior of bromine water on mixtures of quinine and cinchonidine, and of quinine and hydroquinine, was next observed. It was found that the bromine absorption equivalent of the mixture was the sum of the bromine absorption equivalents of the constituents. It is therefore possible to estimate the amount of an impurity in an alkaloid by this process, at any rate when the quantity of an impurity is not very minute. It was found that the double compound of quinine and cinchonidine described by Kerner and Weller as "latent cinchonidine" has a different bromine absorption equivalent from a mixture of the alkaloids. It is therefore necessary, in estimating by this process quinine or cinchonidine containing the double compound, to decompose it by heating previously to 248° F.

A specimen of commercial sulphate of quinine was now completely analyzed, the bromine absorption equivalent being estimated at each stage of the operation. It was found that after drying, after removing the cinchonidine, and after removing the hydroquinine, the alkaloid required precisely the amount of bromine that quinine, in these various degrees of purity, was calculated to require. When, however, an impure quinine sulphate of a similar composition was artificially prepared, the bromine absorption equivalent was found to be lower than that given by the original specimen. This was probably due to the cinchonidine in the latter being in the form of the double compound. A number of essential experiments showed that the process gives constant results, the maximum error when 1 Gm. of alkaloid is used being .008 Gm. of bromine.

Specimens of English, French, German, and Italian quinine were estimated by the process, with the result that 1.029 Gm. of bromine was found to be the average absorption equivalent of 1 Gm. of commercial sulphate of quinine.

If the usual qualitative tests for impurities be first applied and the water be removed, and the double compound of quinine and cinchonidine decomposed by heating to 248° F., the author considers that the process gives a ready and reliable means of estimating the value of commercial sulphate of quinine.

Revised Pharmacopœial Descriptions and Tests.

From the latest report of the Pharmacopœia Committee of the German Pharmaceutical Association we select the following portions as being of direct practical interest in this country.

Those portions of the text which are included in quotation marks (" ") represent changes in or additions to the original text.

Of course, all these modifications are merely recommendations submitted to the Government Pharmacopœia Commission, and are still subject to criticism.

The nomenclature has been changed to that used in this country.

1. *Liquor Calcis.*

Lime.....1 part.
Water.....a sufficient quantity.

Slake the lime with four parts of water, then add to it, under stirring, 50 parts of water. After several hours pour off the liquid, and again pour on the residue 50 parts of water.

When any of the liquid is required, pour it off clear from the sediment.

A clear, colorless liquid of strongly alkaline reaction.

100 C.c. of lime water "should not require less than 4 C.c. of normal hydrochloric acid for neutralization."

Note.—The present Germ. Pharmacopœia requires that 100 C.c., when mixed with 3.5 to 4 C.c. of normal hydrochloric acid, should not yield an acid liquid. Only *one* number should be given as minimum limit.

2. *Aqua Destillata.*

A clear liquid, leaving no residue on evaporation, and without color, odor, or taste.

It should neither be "altered" by mercuric nitrate nor by nitrate of silver, nor should it be rendered cloudy when mixed with twice its volume of lime water.

"On acidulating 100 C.c. of the water with diluted sulphuric acid, and then adding 1 C.c. of solution of chloride of zinc and starch, no color should be developed within 10 minutes."

"100 C.c. of the water, mixed with 1 C.c. of diluted sulphuric acid and 0.5 C.c. of solution of permanganate of potassium (1 in 1,000), should retain the red color for some time if set aside in a closed flask. Nor should the color be entirely discharged when the liquid is heated to incipient boiling."

Note.—The tests of distilled water needed a completion by the addition of one for nitrous acid. Even the least traces of the latter (such as is, for instance, contained in 0.002 Gm. of fuming nitric acid) are indicated by solution of iodide of zinc and starch in presence of a little sulphuric acid.

Regarding the test for organic matter, the requirements of the proposed test are about the same as those of the U. S. P. Well-water may be allowed to contain so much (but no more) organic matter that 100 C.c., acidulated with sulphuric acid, may discharge the color produced by 1 C.c. of the standard permanganate solution on boiling. But distilled water should not discharge all the color produced by only ½ C.c. of the permanganate.

3. *Creosotum.*

A clear, faintly yellowish, neutral, oily liquid, "not" turning brown when exposed to sunlight, strongly refractive, of a penetrating, smoky odor and burning taste. The spec. grav. is "not below 1.070." Creosote usually distils over between 205 and 220° C., does not congeal when cooled to — 20° C., and is miscible to a clear liquid with ether, alcohol, and carbon disulphide. It requires 120 parts of hot water to form a clear solution, which becomes cloudy on cooling, and gradually clears again with separation of oily drops. In the aqueous solution separated from the latter, bromine water produces a reddish-brown precipitate. Another portion of the solution, treated with a very small quantity of ferric chloride, assumes a grayish-green or evanescent blue tint, and finally turns brown, with separation of brown flakes. "An alcoholic solution of creosote is colored deep blue by a minute quantity of ferric chloride, and dark green by a larger quantity."

When mixed with "two and one-half times" its volume of solution of soda [15 per cent], it forms a clear mixture which does not become dark, and remains clear when diluted with much water "(up to 50 times its volume)."

"When mixed with ten volumes of an alcoholic solution of potassa (1 in 5), creosote should solidify, after a short time, to a firm, crystalline mass."

On shaking creosote "in a dry glass vessel" with an equal volume of collodion, no gelatinous mass should appear. When mixed with three volumes of a mixture of three parts of glycerin and one part of water, creosote should remain almost insoluble in it.

"On shaking 1 C.c. of creosote with 2 C.c. of petroleum benzin and 2 C.c. of solution of baryta, the benzin layer should not acquire a blue or dirty, nor the aqueous layer a red tint."

[*Note.*—The reasons for fixing the spec. grav. of creosote at 1.070, and some of the reasons for introducing certain other tests, due to the necessity of making sure that both guajacol and creosol are present in proper quantity, have already been explained by us elsewhere.]

The present Germ. Pharm. requires, among other things, that when creosote is shaken with 10 times its volume of water of ammonia, its volume should not be diminished to more than ¾. But, since ¾ of all the creosol and $\frac{3}{10}$ of all the guajacol present in normal creosote are soluble in the stated quantity of water of ammonia, it follows that normal creosote must yield to the ammonia much more than ¼ of its volume. As a poor creosote, therefore, will stand this test best, the test has to be rejected.

The test with solution of baryta and benzin is introduced for the purpose of ascertaining whether the creosote has been sufficiently purified from the poisonous pyrogallol ethers which exist in beechwood tar.

4. *Oleum Cari.*

[Oleum Carvi, Ph. Germ.]

The higher-boiling portion ("carvol") of the oil from the fruit of *Carum Carvi.*

Colorless or pale-yellowish liquid, attaining its full boiling point at 224° C., and possessing a fine caraway odor. Spec. grav. "0.960." [The U. S. Ph. gives the spec. grav. of ordinary oil of caraway.] A mixture of the oil with an equal volume of alcohol is rendered faintly violet or reddish by "a very minute quantity of" solution of ferric chloride. On mixing 10 parts of oil of caraway with 8 parts of alcohol and 1 part of ammonia, and then saturating the mixture with hydrosulphuric acid gas, a white, crystalline mass results. At least 8 drops of the oil must form a clear solution with a mixture of 3 C.c. of alcohol * and 1 C.c. of water.

* Here and in the other descriptions the alcohol of the German Pharmacopœia, having the spec. grav. 0.833, is understood.

Note.—Though the above description is not applicable to ordinary commercial oil of caraway, but only to its higher-boiling fraction, carvol, the committee do not think it advisable to change the name, although it recommends the introduction of the word "carvol" in the description.

A good distinguishing test between ordinary oil of caraway and carvol—besides the spec. grav. and boiling point—is the increased solubility of carvol in a mixture of 2 vols. alcohol (Ph. G.) and 1 of water; 3 C.c. of this readily dissolve up to 10 drops of carvol, but are unable to completely dissolve as little as 1 drop of ordinary oil of caraway.

It has been found, as the result of many experiments, that the reddish tint produced in a concentrated alcoholic solution of carvol makes its appearance always, provided only a minute quantity of ferric chloride is used. It is best to use, for a mixture of 10 drops each of carvol and alcohol, 1 small drop of a solution of ferric chloride of 1 in 100. If more iron solution is added, the tint is changed.

5. *Oleum Caryophylli.*

The ethereal oil of cloves, having a yellowish to brown color, and a sharp, aromatic odor or taste. It attains a full boil at 247° C. Spec. grav. "1.050 to" 1.060. [U. S. Ph. says about 1.050.] "On shaking 5 drops of the oil energetically with 10 C.c. of lime water, a flocculent precipitate will separate, partly adhering to the walls of the vessel." A solution of 2 drops of oil of cloves in 4 C.c. of alcohol acquires a "green" color upon addition of 1 drop of solution of ferric chloride; if 1 drop of diluted solution of ferric chloride (1 [of original ferric chloride solution] in 20) is used, the color will be blue, "then rapidly change through red to yellow."

On agitating 1 Gm. of oil of cloves with 20 C.c. of hot water, the latter "should scarcely" redden blue litmus paper. If this aqueous liquid is filtered, after cooling, and then treated with 1 drop of ferric chloride solution, it may become "transiently grayish-green," but should not become blue. Oil of cloves should form a clear mixture with "from 1 to 2 volumes" of diluted alcohol [Ph. Germ., sp. gr. 0.892].

Note.—The spec. grav. had been depressed by the last Germ. Pharm. as low as 1.041, but this admits an oil containing too much of hydrocarbon ("light oil of cloves"). At the same time, it would have been too exacting to require a spec. grav. not less than 1.060, as this corresponds to almost pure eugenol.

Note.—When oil of cloves is kept for some time, it becomes slightly acid. Hence it is too exacting to require complete neutrality of the water which had been agitated with the oil. The present Ph. Germ. requires that the filtered water should not be colored either blue or green by ferric chloride. But it has been found necessary to alter the requirement so that only a transient grayish-green tint may be produced in the clear filtrate by 1 drop of ferric chloride solution, which tint soon changes to yellow. If a *blue* color, even only temporarily in the moment of mixing, should appear, this would indicate the presence of phenol. According to the quantity of the latter, the blue color increases both in intensity and in duration, but it also passes finally over into a reddish yellow. This reaction is important as the only sure test for carbolic acid in oil of cloves.

6. *Oleum Cinnamomi.*

The ethereal oil of cinnamon, possessing the aroma of the latter. Yellow or brownish liquid, having a spec. grav. of 1.055 to 1.065 [the U. S. Ph. makes no distinction between oil of Chinese and oil of Ceylon Cinnamon, and gives the sp. gr. at "about 1.040"], and clearly miscible with alcohol in all proportions. On mixing 4 drops of the oil with 4 drops of fuming nitric acid, they unite, "without effervescence," to a mass or crystals or lamellæ.

In a solution of 4 drops of the oil in 10 C.c. of alcohol, 1 drop of solution of chloride of iron may produce only a brown, but not a green or blue color. 10 C.c. of hot water, shaken with 1 drop of the oil, has a sweet, afterwards burning taste; "upon addition of subacetate of lead it acquires a white turbidity, without separating yellow flakes."

Note.—The object of the last-added test (with subacetate of lead) is to show the absence of oil of cloves, which would cause a separation of flakes if present in the proportion of as low as 10 per cent. If more were present, the whole mixture would become intensely yellow. This method of testing for oil of cloves in the expensive oil of cinnamon is preferable to that by means of ferric chloride in an alcoholic solution of the oil. If oil of cloves is present, an effervescence occurs upon addition of fuming nitric acid, and no crystals are then formed, owing to the heat developed. But even in genuine oil of cinnamon no crystals would be produced if larger amounts of oil and acid were mixed than 4 drops of each.

7. *Oleum Cocos.*

[Cocoanut Oil.]

The fat of the seed-kernels of *Cocos nucifera*, of white color and the consistence of butter, melting to a clear liquid at 23 to 30° C., and then developing a faint, peculiar odor.

8. *Oleum Tiglii.*

[Oleum Crotonis, Ph. Germ.]

The fatty, viscid oil expressed from the seed-kernels of *Croton Tiglium*, of a brownish-yellow color, a "disagreeable, peculiar" odor, and reddening moistened [blue] litmus paper. "Spec. grav. 0.940 to 0.960. The oil is soluble in 2 volumes of hot, absolute alcohol."

"On briskly agitating together 2 volumes of the oil with 1 volume of fuming nitric acid and 1 volume of water, it should not congeal, either wholly or in part, within 1 to 2 days. On dissolving 1 Gm. of the oil in a mixture of 5 Gm. of chloroform and 10 Gm. of alcohol, adding 0.9 Gm. of powdered iodine and 1.2 Gm. of powdered mercuric chloride, and setting the mixture aside in a closed vial, repeatedly agitating, the mixture should become decolorized within one hour. Upon afterwards adding 0.1 Gm. of iodine, the reddish tint should remain undischarged for at least one hour."

Note.—The committee investigated the properties and reactions of the oil, which were expressed from the seeds for this purpose by themselves.

A prominent characteristic of croton oil is its peculiar, disagreeable odor, very noticeable in the expressed oil. If the oil is extracted from the seeds by volatile solvents (benzin, carbon disulphide, alcohol, etc.), the subsequent volatilization of the solvent dissipates a portion of the acridity (the escaping vapors are very acrid) as well as of the odor of the oil. An oil thus prepared is sometimes almost odorless.

The spec. grav. of croton oil is a good criterion of its purity, since it is higher than that of most fatty oils. The oil expressed by the committee had a spec. grav. from 0.944 to 0.955. Other samples, reputed to be genuine, varied between 0.941 and 0.960. Of other fatty oils, only castor and linseed oil approach croton oil in spec. grav.

Another special characteristic of croton oil is its solubility in 2 volumes of absolute alcohol. While the oil prepared by the committee was only soluble in *boiling* alcohol, and separated again on cooling, various commercial sorts were soluble in the cold, which can be due only to a different quality of seeds or to a different method of preparation. Unfortunately, the solubility in absolute alcohol does not permit any conclusions as to the purity of the oil, for, although olive, linseed, and poppy oil are not at all dissolved by alcohol, when alone, yet in presence of croton oil they are as soluble in it as the latter itself. Even a mixture of 1 volume of croton and *two* volumes of linseed oil is still dissolved by absolute alcohol; so also a mixture of equal volumes of croton and olive oil.

A nearly certain proof of the absence of a drying oil is furnished by the elaidin test, which leaves genuine croton oil, during many days, liquid and of a light, turbidly yellow color, while if the oil is mixed with a non-drying oil it will solidify within one day, or separate granular masses, according to the quantity of adulterant present. Some sorts of croton oil, when subjected to this test, acquire a dark color; but the cause of this is unknown. The oil obtained by expression is not rendered darker by nitrous acid. It should be mentioned, however, that a mixture of croton and *castor* oil sometimes requires *two* days before solidifying. When executing the elaidin test, great care is to be bestowed upon the strength of the nitric acid, that is, upon its contents of NO_2, since upon this depends the whole success. The acid should have a deep reddish-yellow color, and give out vapors of the same tint. The acid is first put, by means of a pipette, into a graduated glass cylinder, next the water, and lastly the oil. The whole is then well shaken, loosely stoppered, and set aside, the shaking being occasionally repeated.

Since this test does not permit the detection of linseed, poppy, and some other drying oils, the iodine absorption test was added, since croton oil has a high power of absorbing iodine. The test is executed in this manner: 1 Gm. (exact weight) of the oil is first put into a graduated cylinder, then 5 Gm. of chloroform and 10 Gm. of alcohol, next 0.9 Gm. (exact weight) of powdered iodine, and 1.2 Gm. of powdered mercuric chloride. The cylinder is then well stoppered and repeatedly well shaken. The iodine and mercurial salt will shortly become dissolved. The yellowish-red color which the iodine imparts to the mixture disappears after a while in consequence of a compound being formed, and red iodide of mercury gradually crystallizes out. Inside of one hour all the color has been discharged, unless the croton oil was mixed with olive oil, which has a lesser affinity towards iodine than the former. If the color has been discharged inside of the hour, an additional 0.10 Gm. of powdered iodine is added, and the whole again shaken until the iodine is dissolved. If linseed or poppy-seed oil is present, the color will again be discharged after a short time (proportionate to the quantity of these oils present). If the croton oil was pure, the bright-yellow color will remain unchanged for several hours, and will usually not disappear entirely within 12 to 24 hours.

These tests permit the determination of the purity of croton oil with sufficient certainty. The reliability of the above given modification of Hübl's iodine method has been proven by a large number of comparative experiments.

Testing the Purity of Reagents.

(Continued from page 93.)

34. *Potassii Permanganas purissimus* ($KMnO_4$).

Dark-violet, large crystals, containing not less then 99 per cent of the pure salt, and free from sulphuric acid, as shown by the following test: On heating 3 Gm. of the salt with 150 C.c. of water and 15 C.c. of absolute alcohol, until all the color has been discharged, the filtrate, mixed with a few drops of acetic acid and chloride of barium, should not become cloudy on standing for several hours.

35. *Potassii Iodidum.*

The purity of this salt should correspond to the requirements of the Pharmacopœia.

Note.—When iodide of potassium is to be used for preparing volumetric solution of iodine, the salt should be free from iodate. The presence of the latter is shown by the immediate appearance of a blue tint when an aqueous solution of the salt (1 in 20), mixed with a little gelatinized starch, is treated with dilute sulphuric (or hydrochloric) acid. Dr. Krauch recommends to test for iodate in the manner directed under *Acidum hydrochloricum* (see our last March number, page 44), in the test for chlorine.

When larger quantities of iodide of potassium are examined for iodate, a violet color will always be developed by the before-mentioned test. But if a *blue* color were to appear, the quantity of iodate present would be objectionable.

36. *Potassii Nitris purissimus* (KNO_3).

White or very faintly yellowish deliquescent sticks, containing about 90 per cent of pure nitrite of potassium.

Quantitative estimation: The amount of pure nitrite is determined volumetrically by means of permanganate. The strength of the latter is adjusted on the basis of a solution of pure nitrite of silver of known strength.

On adding sulphide of ammonium to an aqueous solution (1 in 20) of the salt, no precipitate should be produced (abs. of heavy metals).

37. *Potassii Sulphocyanidum purissimum* [*Kalium rhodanatum.* CNSK].

White crystals yielding a clear solution with water and with warm absolute alcohol (1 in 10).

The aqueous solution (1 in 20) should not be affected within 5 minutes by chloride of barium (abs. of sulphuric acid).

On adding a little diluted hydrochloric acid (1 C.c. of HCl, sp. gr. 1.190, mixed with 10 C.c. of water) to the solution of the salt (1 in 20), it should remain entirely colorless (abs. of iron).

Addition of sulphide of ammonium to the aqueous solution should produce neither a precipitate nor brown color (abs. of other heavy metals).

Note.—Dr. Krauch states that he often found traces of lead and iron even in the purest specimens of the salt obtainable in commerce. For analysis it is absolutely necessary to have a salt completely free from these impurities.

38. *Potassii Antimonas purus* [*Kalium stibicum.* $K_2H_2Sb_2O_7$].

A white powder. On dissolving 1 part in 250 of water, the solution should be clear and neutral. It yields a precipitate with a concentrated solution of chloride of sodium.

39. *Aqua Ammoniæ.*

A clear, colorless liquid, having the spec. grav. 0.925, and containing 20 per cent of gaseous ammonia. [Note by Ed. Amer. Dr.—Of course it is often immaterial whether the spec. grav. or percentage of water of ammonia varies a little from that here given or not. Nevertheless it is a great advantage if any firm will guarantee to sell, as a reagent, no other water of ammonia but that which has a definite spec. grav. or percentage.]

Test for pyridine and chlorides: On diluting 10 C.c. of water of ammonia with about 30 C.c. of water, and supersaturating with nitric acid, the liquid should remain colorless, and on subsequent addition of nitrate of silver no alteration should take place.

Dr. Krauch confirms the statement of other observers that pyridine as well as pyrrhol are frequent impurities in commercial water of ammonia.

On evaporating 15 Gm. of water of ammonia in a porcelain capsule on a water-bath, not more than minimal traces of residue should remain. Small traces are always found; the fixed matter is probably derived from the containers.

The absence of metals and of sulphates is tested for in the usual manner.

Test for carbonate: On mixing 10 C.c. of water of ammonia with 10 C.c. of water and 40 C.c. of lime-water, no cloudiness should be produced.

40. *Liquor Ammonii Sulphidi* (Solution of Sulphide of Ammonium).

A colorless or only faintly yellowish liquid, which, when treated with acids, gives off an abundant amount of hydrosulphuric acid gas without throwing down a colored precipitate.

Test for carbonate of ammonium and free ammonia: On adding lime-water or solution of sulphate of magnesium to sulphide of ammonium, no precipitate should appear, even on warming.

41. *Magnesia*, free from Sulphuric Acid.

Since both carbonate of magnesium and magnesia cannot be deprived completely of sulphuric acid, and an absolutely pure magnesia is occasionally wanted for special purposes, this was obtained by oxidizing magnesium.

Test for sulphuric acid: Dissolve 3 Gm. in moderately dilute hydrochloric acid, dilute with water to 100 C.c., heat to boiling, and add chloride of barium. No sign of sulphate of barium should appear within twelve hours.

42. *Sodii Bisulphis purus.*

White powder, having a strong odor of sulphurous acid. Contains about 90 to 95% of the true bisulphite. The strength is determined by means of one-tenth normal solution of iodine.

Test for arsenic: Mix 5 Gm. of the salt with pure, concentrated sulphuric acid, and evaporate to dryness. The residue should not be altered by aqueous solution of hydrosulphuric acid, nor rendered yellow by addition of solution of molybdate of ammonium acidified with nitric acid, and application of a gentle heat.

Owing to the constant loss of sulphurous acid, it is practically impossible to obtain a 100% salt in the market.

43. *Sodii Carbonas crystallisatus purissimus.*

Large, translucent crystals, yielding a clear solution with water.

On mixing 20 Gm. with an excess of diluted hydrochloric acid, evaporating, drying the residue for some time at 100° C., and then redissolving with a little hydrochloric acid in about 150 C.c. of water, a clear solution should be produced, free from silicic acid flakes.

A solution of 10 Gm. in 150 C.c. of water, faintly acidulated with hydrochloric acid, heated to boiling, and treated with chloride of barium, should show no trace of sulphate of barium after twelve hours (abs. of sulphuric acid).

Nitrate of silver should not affect a solution of 5 Gm. of the salt in 50 C.c. of water and faintly acidulated with nitric acid (abs. of chlorine).

Test for arsenic: Put 10 Gm. of metallic zinc free from arsenic into a flask of about 200 C.c. capacity, forming part of a Marsh's apparatus, and generate hydrogen by means of diluted sulphuric acid (1 : 3). After the apparatus and reagents have been shown to be free from arsenic, dissolve 30 Gm. of the cryst. carbonate of sodium in a little water, supersaturate it with diluted sulphuric acid (known to be free from arsenic), and pour the solution gradually into the generator, maintaining a slow current of gas for about half an hour. No trace of an arsenical mirror should become visible during that time.

Note.—Arsenic has been found in carbonate of sodium both by Fresenius and by Otto.

Test for heavy metals: Dissolve 20 Gm. in 60 C.c. of water, supersaturate with hydrochloric acid, and add ammonia and sulphide of ammonium in slight excess. No precipitate, cloudiness, or green coloration should appear.

Phosphoric acid is tested for as directed under *Potassa purissima.*

Note.—A carbonate of sodium of the quality above specified is necessary only in special cases. Usually the so-called "Natrium carbonicum purissimum" of commerce is sufficiently pure for analytical purposes. This usually contains only traces of iron, chloride of sodium, and sulphate of sodium.

The ordinary crude carbonate may contain hyposulphite and sulphide of sodium, besides silicates, arsenic, iron, chlorides and sulphates of sodium and of other metals. Chlorides and sulphates are particularly common.

44. *Sodii Chloridum purum* (Natrium chloratum chem. purum).

Five Gm. of the salt yield, with 20 C.c. of water, a clear and neutral solution. On diluting this to 80 C.c., heating to boiling, and treating with chloride of barium, no reaction for sulphuric acid should appear after several hours.

45. *Soda purissima* (Natrium hydricum purissimum e Natrio).

Note.—For the same reason as given under Potassa, we give a detailed description of the various commercial varieties of soda, so that our readers may know what to expect when they order one or the other of them.

White, crystalline lumps, soluble to a clear solution in water, and free from alumina. (Tests same as in the case of potassa purissima.) After having shown the absence of alumina, the faintly alkaline solution remaining after this test should not be altered by oxalate of ammonium (abs. of calcium), or by sulphide of ammonium (abs. of heavy metals).

Tests for chlorine, sulphuric and silicic acids as in the case of potassa.

Only traces of carbonic acid permissible. A solution of 2 Gm. of this quality of soda in 10 C.c. of water, when

poured into a mixture of 8 C.c. of hydrochloric acid (1 : 120) and 8 C.c. of water, yields a liquid in which only slight, minute bubbles are visible, but no effervescence.

46. *Soda pura* (Soda alcohole depurata. Natrium hydricum alcohole depuratum. Natrium hydricum purum).

A white, crystalline mass, or white sticks, forming a clear and colorless solution with water.

On dissolving 10 Gm. in water to make 100 C.c., supersaturating with acetic acid, then adding ammonia in slight excess, only trifling flakes of alumina should separate. Subsequent addition of oxalate or sulphide of ammonium should not produce any precipitate.

Tests for nitric and silicic acid and chlorine, as in the corresponding quality of potassa.

Test for carbonic acid, as under No. 45.

Test for sulphuric acid: A solution of 1 in 20, after being acidulated with hydrochloric acid and treated with chloride of barium, is rendered only faintly turbid, so that a portion of the liquid, in a test-tube of 2 Cm. in diameter, does not become opaque.

Note.—The commercial brands of this quality of soda often contain considerable sulphuric acid and chlorine.

47. *Soda depurata* (Natrium hydricum depuratum).

White, crystalline lumps or sticks.

General tests as in the corresponding quality of potassa.

The usual impurity occurring in this kind of soda is chloride, from 1 to 2 per cent.

48. *Sodii Nitras purissimus.*

Colorless crystals, yielding a clear solution with water.

Test for calcium and heavy metals: A solution of 5 Gm. of the salt in 50 C.c. of the water should be neutral, and should not be altered by ammonia, oxalate of ammonium, and sulphide of ammonium. A portion of the original solution, slightly acidulated with hydrochloric acid, is not altered by hydrosulphuric acid.

A solution of 5 Gm. in 100 C.c. of water is not affected by chloride of barium, even after standing some time (abs. of sulphuric acid).

No cloudiness should be produced by nitrate of silver in a solution of 1 in 20, acidulated with nitric acid.

49. *Sodii Nitris.*

Small, colorless crystals or sticks, containing 98 or 100 per cent of the pure salt. The strength is estimated as in the case of Potassii Nitris.

Heavy metals must be absent, as shown by the fact that hydrosulphuric acid should not affect the aqueous solution of the salt.

50. *Sodii et Ammonii Phosphas* ($Na(NH_4)HPO_4.4H_2O$).

Colorless crystals, yielding, when heated on the loop of a platinum wire, a clear and colorless bead.

The precipitate caused in an aqueous solution of the salt by nitrate of silver should entirely dissolve upon addition of nitric acid (abs. of chloride).

51. *Sodii Tungstas purissimus* (Natrium wolframicum purissimum).

Colorless crystals.

Determination of tungstic acid: Decompose the salt by hydrochloric acid, expel the excess of the latter completely by a heat of 120–125° C., dissolve the resulting chloride of sodium with water, filter, wash the tungstic acid remaining on the filter with diluted solution of nitrate of potassium, and afterwards with very dilute nitric acid, finally ignite and weigh.

Test for chloride and sulphate: Boil the aqueous solution (1 in 20) with nitric acid, filter, and to a portion of the filtrate add a few drops of solution of nitrate of silver, when not more than slight turbidity should occur. Treat another portion of the filtrate with chloride of barium, which also should cause only a faint turbidity.

Note.—Dr. Krauch states that some commercial brands of this salt are very impure. He found in one sample 30 per cent of carbonate of sodium (calculated as crystallized).

52. *Platini Chloridum purum.*

Brownish-yellow, dry, crystalline fragments.

Solubility: 1 Gm. should form a clear solution in 10 C.c. of alcohol.

Note.—If the alcoholic solution leaves a notable greenish-yellow residue, this is probably due to the presence of platinous chloride. This impurity is occasionally met with. Such an impure salt usually yields a very dark-brown aqueous solution (1 in 10).

Foreign matter: On strongly igniting 2 Gm. of the salt, digesting the residuary metallic platinum during fifteen minutes upon a water-bath with a mixture of 5 C.c. of nitric acid (sp. gr. 1.200) and 20 C.c. of water, filtering, evaporating to dryness, and igniting the residue (if any), not more than a trace of fixed residue (at most 4 to 5 milligrammes) may remain.

Note.—Such traces are unavoidable, being derived from the vessels in which the platinum is subjected to the action of acids.

53. *Plumbi Oxidum purissimum.*

Test for carbonate, copper, alumina, and metallic lead: Upon 2 Gm. of the oxide, in a test-tube, pour 5 C.c. of water, then add gradually an excess of acetic acid. No carbonic-acid gas should be given off. The resulting solution should be clear, or not more than faintly turbid, and should not show a precipitate of metallic lead. Precipitate the acetic solution with sulphuric acid, and filter. The filtrate, when supersaturated with ammonia, should not separate flakes of alumina, and should not exhibit a blue or bluish tint.

54. *Stanni Chloridum crystallisatum purum* ($SnCl_2.2H_2O$).

Colorless crystals.

Test for earths and alkalies: On dissolving 3 Gm. in 100 C.c. of water, adding hydrochloric acid, then precipitating with hydrosulphuric acid, filtering, and evaporating the filtrate, only traces of residue may remain.

An aqueous solution (1 in 100), when acidulated with hydrochloric acid, should yield no precipitate with chloride of barium (abs. of sulphuric acid).

On heating the salt with solution of caustic soda, no ammonia should be given off.

On boiling 2 Gm. of the salt with 10 C.c. of pure concentrated hydrochloric acid for a few minutes, the liquid should remain perfectly clear and colorless (abs. of arsenic).

Note.—The commercial salt is often contaminated with much sulphuric acid.

55. *Uranii Nitras purissimus crystallisatus* ($UrONO_3.3H_2O$).

Large, greenish-yellow crystals. The aqueous solution (1 in 20), when tested with chloride of barium, should yield no cloudiness after standing 5 minutes (abs. of sulphuric acid). On adding an excess of carbonate of ammonium to the aqueous solution (1 in 20), no cloudiness should occur (abs. of earths). If 5 Gm. are mixed with 5 C.c. of hydrochloric acid, then diluted to 100 C.c., and a current of hydrosulphuric acid passed through the liquid, no precipitate should be produced (abs. of other metals).

Test for uranous salt: On dissolving 1 Gm. in 20 C.c. of water, acidulating with 1 C.c. of sulphuric acid, and adding 1 drop of normal solution of permanganate of potassium (of which 1 C.c. = 0.0056 Fe), a permanent red tint should be produced (absence of uranous salt).

56. *Zincum metallicum sine arseno* (metallic zinc, absolutely free from arsenic).

Of metallic lustre, and available either granulated, or in powder, or in sticks.

Test for arsenic: Introduce 20 Gm. into a 200 C.c. flask, forming part of a Marsh's apparatus, and generate hydrogen gas by means of diluted sulphuric acid (1 to 3 of water), until most of the metal is dissolved, which should take several hours. No trace of arsenical mirror should make its appearance during this time.

[*Note.*—In this quality of zinc, the main stress is laid upon the complete absence of arsenic, while no material importance is attached to the possible presence of other impurities. The next succeeding variety of metallic zinc is not only free from arsenic, but also from almost every trace of other metals.]

57. *Zincum metallicum purissimum.*

Test for arsenic: As in the preceding.

Test for iron, lead, copper, etc.: Dissolve 10 Gm. with about 60 C.c. of water and 15 C.c. of pure concentrated sulphuric acid in a little flask, closed with a rubber valve. The solution should show at most unweighable traces of undissolved matter (lead, etc.). After the zinc has been almost entirely dissolved, add 1 or 2 drops of normal permanganate, which should cause a distinct reddish tint (showing that there are, at most, but minute traces of iron present).

If a very exact determination of the iron is required, a separate assay with permanganate should be made upon the diluted sulphuric acid *without* the zinc.

Note.—The presence of iron, and its amount, may also be determined as follows: Dissolve the zinc in water with the aid of hydrochloric acid, oxidize any iron present by nitric acid, and add ammonia in excess. This throws down the iron in form of brown ferric hydrate. Collect this on a filter, wash with ammoniacal water, dry, and weigh.

The Standard Kilogramme.

MR. BERTRAND, perpetual secretary of the Academy of Sciences, reported at a recent meeting that the platinum and iridium alloy necessary for the thirty-six international standards has been received from the English firm of Matthey by the Metrical Weights and Measures Committee. The alloy proved to be chemically pure, and to consist of 9 parts of platinum and 1 of iridium, as ordered, but its physical properties left something to be desired, the specific gravity being slightly under the theoretical figures. Microscopical examination also showed the metal to be too loosely grained. In consequence, the alloy was submitted to repeated annealing and powerful hammering until the specific gravity exactly agreed with theory, and could no longer be increased by further treatment. The commission now consider their metal perfect, and will proceed to execute the standard weights to be distributed.—After *Chem. and Drugg.*

Best Method of Preparing Nitrogen for Demonstrations.

DR. CHARLES R. C. TICHBORNE states that he has for a long time used the following method of preparing nitrogen gas for lecture purposes:

Ten Gm. of ammonium sulphate and 10 Gm. of sodium nitrite are mixed in a capacious retort with 40 C.c. of glycerin and 60 C.c. of water. The retort should be of the capacity of half a liter, or about 16 ounces. The retort is placed with the neck elevated to an angle of about 40°, so that the water may condense and fall back into the retort. A bent tube is fitted with a cork into the neck, and conducts the gas into a wash bottle, or it may be collected at once for general purposes without washing.

One hundred C.c. of water may be used in place of the mixture of glycerin and water, but it does not seem to work quite so regularly. Heat is applied directly to the retort, and the disengagement of free nitrogen begins at a temperature a few degrees below the boiling point of water. It steadily but rapidly proceeds—the temperature generally rises a few degrees above the boiling point, but after a little time again begins to fall. A gentle but constant heat will, however, keep up the disengagement of gas until the nitrite is all decomposed. It is desirable to slightly increase the heat towards the end of the reaction.

There is nothing specially new in this process, except the substitution of the sulphate for the chloride, and in the determining of the exact conditions under which the experiment may be carried on successfully for class illustrations, or for the purpose of procuring pure nitrogen with the least expenditure of trouble. If the reaction is pushed on very rapidly, ammonia will be evolved, and this phenomenon is most marked when using the chloride in place of the sulphate. If carried on slowly with the sulphate, no ammonia is evolved, but a trace of nitrogen dioxide is produced, which may be easily removed by washing with a dilute solution of permanganate of potassium. By carefully regulating the temperature, almost pure and neutral nitrogen will be evolved.—*Chem. News.*

Chloride of Methyl Spray in Neuralgia.

SINCE Dr. Debove showed how valuable the spray of liquefied chloride of methyl gas was in the topical treatment of various neuralgias, the literature of the subject has grown considerably, and many cases of cure resulting from the application of the spray to the neuralgic area have been recorded. The gas, however, had to be liquefied by pressure, and the cylinders containing it were bulky and complicated. Galante et Fils, of Paris, have lately made for Dr. Debove (Feb., 1888) a small, portable cylinder which has brought the method into general use in France. The cylinder has a milled-headed screw at the bottom of the apparatus, by the turning of which a fine spray jets out from an aperture just above it. This spray can be regulated to a nicety by the screw. A correspondent, who has recently tested the method, reports that he has employed it in over fifty cases with the following result: "The action of the spray upon the skin is remarkable. Such intense cold is instantaneously developed that, directly the chloride of methyl touches the skin, the latter becomes hard, iced, white, and frozen. At the same time the patient feels as if he had been touched with a hot iron. Two seconds, or at the most five, are quite long enough for its application to any one patch of skin; for the skin will rapidly vesicate, and even become gangrenous, if the spray is continued for a longer period. It is better to play the spray *obliquely* over the skin, letting it glance off, rather than direct it straight at and in close proximity to the part. It has been used in France for extracting teeth painlessly, also in minor operations for local anæsthesia, and is recommended for trigeminal neuralgia. Concerning the last, I would at once dissuade others from using it upon the face, for the application leaves a most disfiguring brown coloration which takes a long time to fade. Of its value in the treatment of neuralgia there is no question. I have taken fifty cases of various neuralgias of the neck, back, testicle, urethra, and legs, and have relieved many temporarily and some permanently by its use. It is a rapid and effective vesicant, and has proved of value as a substitute for the often useful plan of 'firing' joints. As a 'moral' force in neuromimesis and malingering, it will doubtless be most persuasive."—*Lancet.*

Chlorate of Potassium as an Explosive.

CHLORATE of potassium is the most explosive substance with which chemists and druggists have to deal. By itself it seldom gives rise to serious accidents, but the violence of its character is occasionally shown, and most frequently and disastrously in the case of colored fireworks. We learn from a report of Her Majesty's Inspectors of Explosives that Mr. Dupré, the chemist to this department, last year had to investigate an accident in Pain's fireworks factory arising from the explosion of colored stars. The results are of interest as corroborating previous observations regarding the highly sensitive nature to percussion and friction of chlorate mixtures, particularly at slightly elevated temperatures. The chemicals employed in the manufacture of the stars were found to be chlorates of barium and potassium, nitrate of strontium, shellac, coal, and lamp-black. Lamp-black is liable to contain an appreciable quantity of free sulphuric acid, but there was none in this case. It was found, however, that one of the ingredients (Chertier's copper) of one of the stars was distinctly acid, and was the cause of the explosion. Chertier's copper is a mixture of chlorate of potassium and sulphate of copper, which has been moistened with ammonia and dried. When freshly made it is alkaline, but in time it loses ammonia, becomes acid, and evolves chlorine compounds, owing to the decomposition of the chlorate of potassium by the sulphate of copper. In other words, Chertier's copper is liable to spontaneous decomposition, and the presence of such a substance in a combustible or explosive mixture cannot but be highly dangerous. It is marvellous how little is required to produce "spontaneous" decomposition in these explosives. Thus the paste used for making pill-boxes becomes acid, owing to a change in the alum of the paste; and as no chlorate mixture should ever be brought into contact with materials that are either acid in themselves or are liable to become acid in the course of keeping, it is obvious that the spontaneous ignition of such mixtures kept in these boxes becomes merely a question of time and circumstances. These remarks apply more particularly to fireworks, but pharmacists will do well to keep the facts in mind when they are handling powders or other preparations containing chlorates.—*Chem. and Drugg.*

Dangerous Combustion Products from Chloroform.

A COMMUNICATION from Dr. Stowasser, reporting the occurrence of untoward symptoms during the administration of chloroform in a room where a gas flame was burning, apparently as a consequence of the formation of some noxious compound, has called forth several other notices to a similar effect (*Pharm. Zeit.*, April 6th, p. 221).

Professor Sterson, of Leyden, says that during last winter severe and sudden asphyxia occurred repeatedly in the operation room of a small, newly erected hospital where, on account of insufficient heating arrangements, the gas lamps were ignited on cold days. In one case even death resulted under conditions that he thinks inexplicable except by referring it to the combination of chloroform vapor with the combustion gases of the gas-lights. As soon as a larger stove was obtained and the burning of gas discontinued during operations, the chloroform narcosis became again normal. Dr. Fischer, of Carlsruhe, reports a case where, after a time, all present in the room were affected by an irrepressible tendency to cough, followed by sense of fulness in the head, headache, and even vomiting. The room appeared full of a whitish vapor, especially in the neighborhood of the gas-lamp. Dr. Hartmann, of Otterstein, also records a case where an odor of chlorine was noticed, and a tendency to cough was developed in all present, which was relieved upon the access of fresh air. The observation is not a new one, since, in a passage quoted from v. Langenbeck, there is a warning that operations by gas-light might become dangerous through the formation from the volatilized chloroform of the irrespirable chloro-carbonic acid.—*Pharm. Journ.*

Arsenical Glycerin.

THE statement made some time since that in Germany glycerin is met with containing arsenic has been confirmed, and, in addition, it has been alleged that, under the present conditions of manufacture in that country, all glycerin will contain more or less arsenic derived from the sulphuric acid used in its production. The necessity for the insertion in the German Pharmacopœia of a test for arsenic in glycerin is therefore obvious, and one has been suggested by Dr. Vulpius (*Apoth.-Zeit.*, April 10th, p. 390). It requires that paper moistened with a 50% solution of silver nitrate, when exposed to the hydrogen gas evolved upon adding zinc to a mixture of 2 C.c. of glycerin with 3 C.c. of officinal hydrochloric acid, should not within fifteen minutes show any yellow spots becoming black upon being moistened with water.—*Pharm. Journ.*

Remedy for Nasal Catarrh.

A solution which has been found to give better results than that known as Dobell's (*Liquor Sodii Boratis Compositus*, Nat. Form., No. 235), and which has proved to be very efficacious as a local application to the nasal membrane in acute nasal catarrh, is prepared in the following manner, according to the *Med. and Surg. Rep.*:

Sodium Bicarbonate	dr.	8
" Borate	"	8
" Benzoate	gr.	20
" Salicylate	"	20
Thymol	"	10
Eucalyptol	"	10
Menthol	"	5
Oil of Gaultheria	gtt.	6
Glycerin	fl. oz.	8½
Alcohol	" "	2
Water to make	" "	16

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EDITORIAL.

So many and various programmes have been published for the guidance of prospective tourists who may intend going to the San Francisco meeting of the American Pharmaceutical Association, that it is to be hoped that measures may be taken to insure greater unanimity hereafter in the work of the committee of arrangements. It is unfortunate that dissensions should have occurred in regard to this particular matter, for it is liable to discourage the attendance of some who might otherwise have made this an occasion for visiting the Pacific coast. It is quite certain that the California members have prepared a most cordial reception, and that everything possible will be done by them to make the meeting enjoyable. It will, therefore, be a matter for much regret if anything which transpires on this side of the continent diminishes the number of guests.

We await with much interest the action of the American Medical Association with reference to the proposed exchange of delegations with the American Pharmaceutical Association.

The time seems to have arrived when concert of action should take place respecting questions of mutual interest to the two professions. Among the foremost of these is the revision of the Pharmacopœia. Whatever may have been the feelings of former generations of physicians, the present seems to have little, if any, appreciation of the character of the Pharmacopœia or of its importance as a standard. The majority of younger physicians have probably never seen the work, and are far more inclined to place their reliance upon the products of certain manufacturing firms than upon such as are to be found in the trade generally; and when we consider that the pamphlets and other advertisements of these firms are systematically, frequently, and persistently circulated gratuitously; that medical journals are constantly using their influence to promote the sale of proprietary articles, and that it is rarely that they ever refer to the importance of the Pharmacopœia or to the articles contained in it, this condition of affairs is perhaps not surprising. We have had occasion to believe that a large proportion of the younger physicians think that the title pharmacopœia is only a synonym for one or another of the dispensatories, and, if they recognize any difference at all, are inclined to the opinion that a dispensatory is an authoritative work upon which the pharmacopœia is a sort of commentary made by apothecaries for their own particular benefit, and that their motive in doing this is to enable them to furnish cheap drugs without being detected by doctors.

An otherwise intelligent physician, who was recently asked whether he had any interest in the forthcoming revision of the Pharmacopœia, declared that he had not; that he much preferred the products of reliable manufacturers to pharmacopœial preparations; and when asked to mention an instance which would justify his opinion, said that he had lately prescribed for a patient a solution of bisulphate of quinine, which had been prepared by a well-known pharmacist who was reputed to be skilful, and who was a graduate of a European school. The first time the solution was prepared it worked all right; but although the prescription was renewed several times thereafter, it had failed to produce cinchonism in his patient, and he had reason, he thought, to believe that the apothecary had substituted a weaker salt of quinine.

It is hardly necessary to say that it was not considered worth the trouble to continue the discussion further.

Another condition which helps to make matters worse is the fact that some teachers in medical colleges are in the habit of recommending in their lectures the use of proprietary articles, and of specifying the products of certain manufacturing pharmacists, and that in very few courses of lectures upon materia medica and therapeutics is any pains taken to inform students of the true nature of the Pharmacopœia and its relation to the medicines in common use, or to the medical and pharmaceutical professions.

There is but one practical way for overcoming this want of general information respecting this important work, and that is by popularizing it and distributing it through the various State associations, so that a copy will be put into the hands of the majority of physicians throughout the country. The details of such a scheme will necessitate much study and will involve some expense, but in no other way does it seem possible to overcome the ignorance which seems now to exist regarding it, or to offset the influence of dispensatories and pamphlets issued for private gain.

A physician prescribed two drachms of Magendie's solution of morphine. It was dispensed by an apothecary in a two-ounce vial with a narrow neck, whereat the doctor called the apothecary bad names, and suggested to his patient that it might be advisable to take his prescriptions to another dispenser in the future.

Will some of our readers express an opinion as to what the matter was, and why the doctor was wroth, and why he recommended a change of patronage?

Obituary.

DR. CHARLES A. ROBBINS, son of the late Daniel C. Robbins, and member of the firm of McKesson & Robbins and of the New York Quinine and Chemical Works, died on May 4th, at his residence in Brooklyn, at the age of 34 years. He was a graduate of the College of Pharmacy (1873), and later went to Germany, where he studied chemistry and obtained the degree of Ph.D. He leaves a widow and two children.

CHARLES E. FOUGERA, who founded the firm of E. Fougera & Co., of New York, died at Brooklyn on April 22d, at the age of 68 years. He was a graduate of the University of Paris, and of the College of Pharmacy of the City of New York.

Salicylic Acid.—In order to detect the presence of meta- or para-oxybenzoic acid in salicylic acid (ortho-oxybenzoic acid), Professor L. D. Koninck recommends a method based upon the fact that salicylic acid volatilizes in the vapor of water (*Pharm. Zeit.*, April 6th, p. 222). A small quantity of the acid to be examined is reduced to a finely divided condition with water, and is then evaporated slowly to dryness in a porcelain dish. The acid should entirely volatilize; if there be any residue, it would indicate the presence of one or other of the isomers, or more probably a mixture of both.—*Pharm. Journ.*

QUERIES & ANSWERS.

Queries for which answers are desired, must be received by the 5th of the month, and must in every case be accompanied by the name and address of the writer, for the information of the editor, but not for publication.

No. 2,320.—**Botanical Material** (Erie).

Botanical mounting paper, genus and species covers, and drying paper, such as is used by botanists, may be had, cut to proper or standard size, from A. L. Cassino, Naturalists' Agency, 196 Summer street, Boston, Mass.

No. 2,321.—**Covering the Taste of Creosote** (W. L. & Co.).

One of the most efficient agents for covering the taste of creosote is a concentrated decoction or extract of coffee. We should, however, not use the word "covering," for it is impossible to hide the taste or odor completely. It is only possible to modify it so that it will not leave a disagreeable taste of long duration in the mouth.

Another good method of administering it is suggested by one of our correspondents, who recommends each dose to be given in a little vanilla ice-cream.

No. 2,322.—**Kola Nut and Kola Paste** (C. F. D.).

After Thomas Christy, of London, had been instrumental in drawing the attention of the European medical world to the Kola nut (in his *New Commercial Plants*, No. 3, Lond., 1880), we published an illustrated article on the subject (in NEW REMEDIES, 1881, p. 34), in which the subject was treated at length, and where we also showed, by quotations from Clusius and other authorities, that Kola nuts have played an important part in the country of their growth for a long time past. Further contributions to our knowledge on the Kola nut, from various sources, will be found in this journal (AMER. DRUGG.), 1885, 5; 133. 1886, 155 (Kola paste). 1887, 75; 148. 1888, 163.

No. 2,323.—**Preventing the Creeping of Salts** (Ed. J.).

We are asked to state how the tendency of certain salts, when crystallizing from a solution, to gradually creep up along the sides of the vessel and to pass over the edge, may be prevented.

This may easily be accomplished by rubbing the inner side of the vessel, above the level of the liquid, with a little oil. But it should be applied sparingly. If the liquid is to be exposed for a long time, it is preferable to substitute a somewhat harder coating for the oil, the latter having, besides, the disadvantage that it will develop a rancid odor. A good mixture to apply (warm) is: vaseline 1 part, white wax 2 parts.

No. 2,324.—**Cascara Sagrada** (Junior).

Our correspondent has seen a note in a recent English pharmaceutical paper (evidently the *Pharm. Journ.*) in which the pronunciation of the word *cascara* was discussed. It was stated there that the first word should be pronounced *cáscara*, with the accent on the first syllable, since this is the way the Spanish *cascara* (bark) is actually pronounced.

In reply, we would say that the before-mentioned method of pronunciation is, indeed, the correct one. "Cascara" means not only bark, but is also employed as a name for a "bark canoe" in some parts of South America. However, the incorrect pronunciation *cascára*, with accent on the middle syllable, has become so general in this country that it is doubtful whether the correct one will take its place.

No. 2,325.—**Sozoiodol** (M. V.).

This is a compound derived from di-iodo-paraphenolsulphonic acid, patented by H. Trommsdorff, of Erfurt. As the acid itself is too little soluble, it is combined with various bases, such as sodium, potassium, ammonium, barium, lead, mercury, silver, zinc, etc., etc. By common consent of the manufacturer and the trade, the *sodium* salt is furnished when "sozoiodol" without further specification is ordered.

The chemical composition of the sodium salt is $NaC_6H_2I_2(OH)SO_3.2H_2O$. Sometimes the sodium salt is designated by the term "sozoiodol, easily soluble," while the potassium salt is called "sozoiodol, difficultly soluble."

The salt is prepared from paraphenolsulphonate of potassium (paraphenolsulphonic acid is one of the products resulting from the action of concentrated sulphuric acid upon phenol) by dissolving this salt in an excess of diluted hydrochloric acid, and then adding a solution of iodide and iodate of potassium (KIO_3+5KI), or chloro-iodine, under constant stirring. The iodine, which at first separates, soon disappears, and the liquid solidifies, owing to the separation of white crystalline needles. These are pressed to remove mother-water and then recrystallized from boiling water. When pure, they represent the "difficultly soluble sozoiodol," or "potassium sozoiodol." By interreaction of this salt with chloride of barium, the corresponding barium salt is obtained. From this the free di-iodo-paraphenolsulphonic acid may be liberated by decomposition with the calculated amount of sulphuric acid, and from the free acid the sodium salt finally prepared.

Sozoiodol-potassium is in form of colorless, prismatic crystals, soluble in 50 parts of water to an acid liquid which assumes a violet-blue tint with ferric chloride. On addition of fuming nitric acid, iodine is separated. Sozoiodol-sodium is also in form of colorless, prismatic prisms, requiring only 13 to 14 parts of water or glycerin for solution. The cold-saturated solution of either salt furnishes with nitrate of silver a white precipitate soluble in nitric acid (abs. of chlorides). A yellow precipitate would show the presence of iodides, though chlorides may then, of course, be also present. On adding to the aqueous solution of either salt some chloride of barium solution, the resulting precipitate must dissolve on boiling the liquid, showing absence of sulphate (Hirsch).

No. 2,326.—**Hostetter's Bitters** (C. S.).

The following formula was furnished to us some years ago by one of our correspondents. We are not sure whether it will produce a product identical with the genuine. Of course, the recipe of the latter is private property, and the owners are not likely to divulge it:

Calamus	2 lbs.
Orange Peel	2 "
Cinchona	2 "
Gentian	2 "
Colombo	2 "
Rhubarb	8 oz.
Cinnamon	4 "
Cloves	2 "
Diluted Alcohol	4 gall.
Water	2 "
Sugar	2 lbs.

Reduce the solids to powder and percolate with the diluted alcohol and water previously mixed; then dissolve the sugar in the percolate.

No. 2,327.—**Chewing Gum** (H. T. S.).

The manufacturers of chewing gum use different ingredients and in varying proportion. Spruce gum used to be one of the principal bases, but this was afterwards partly replaced by soft paraffin or by balsam of tolu. Afterwards, when gum chicle (balata) became better known in this country, this was found to be the most preferable base, and probably all chewing gum now made contains more or less of it. What proportion of these ingredients the commercial kinds of chewing gum contain is not known to us. This would have to be determined by a quantitative analysis, preceded by a careful study of the solubility of the constituents. As to the flavors used for chewing gum, we regret that we are unable to state the composition of those mentioned by our correspondent. Nor is any one else likely to know it except the manufacturer.

No. 2,328.—**Silicate of Sodium** (J. W. W.).

On page 78 of our last April number we published a formula for a "Fertilizer for House Plants," in which silicate of sodium was directed as one of the ingredients. Our correspondent used the viscid, jelly-like mass which, though soluble in water when fresh, yet soon absorbs carbonic acid gas from the air and sets free insoluble silicic acid. He asks our advice in the matter.

There is both a solid (or semi-solid) and a syrupy liquid "silicate of soda" in the market. The former is not suitable for preparing aqueous solutions, as it will always leave more or less insoluble residue. The latter kind, appearing like a clear, dense syrup, mixes freely and clear with water, and is the kind used by surgeons to make silicate dressings. We advise this to be used. It is manufactured by Feuchtwanger & Co., of New York, and probably also by others, and may be obtained through any wholesale drug house.

No. 2,329.—**Chloroborite of Sodium** (Newark).

A salt which Merck calls "chloroborite" of sodium was recommended some time ago by Dr. R. Rueger (at the Convention of German Naturalists at Cologne in 1888) as a food preservative and antizymotic, when used in the proportion of 1 part by weight of the salt to 200 parts of the substance to be preserved. Its antiseptic action is *said* to be caused by a slow, spontaneous elimination of chlorine from the salt. We doubt the latter statement, since the quantity of chlorine thus made available for every 200 parts of material would surely be too small to retard or arrest fermentative or putrefactive processes. It seems to us much more likely that the compound is merely a mixture of chloride of sodium and boric acid, perhaps with some borax. Of course this is merely conjecture, as we have not had an opportunity of examining it. But it seemed to us improbable that any preservative which could give off free chlorine would be suitable for articles of food.

No. 2,330.—**Ehrlich's Test for Typhoid Urine** (P. H. G.).

We have given this test before, but it is only of late that it has been more frequently quoted by the name of its discoverer, viz., as "Ehrlich's Test." It appears to have stood

the criticism of the profession thus far. The reagents necessary, and execution of the test, are as follows:

1. *Sulphanilic Acid.*—A saturated solution of this in dilute (1 in 20) hydrochloric acid.

2. *Nitrite of Sodium.*—A solution of 1 part of this salt in 200 parts of distilled water.

Both of these solutions should be fresh. At least the last-named should be so, as it cannot be kept many days without spoiling. When the solutions are mixed, sulphanilate of sodium and free nitrous acid is formed (with an excess of sulphanilic acid), and this is the real test solution wanted. But, owing to the extreme instability of the latter, it cannot be prepared for stock, but must be made fresh before every test or series of tests.

For use, mix

25 C.c. of the sulphanilic solution.
1 C.c. of the nitrite solution.

With this mix an equal volume of the urine to be examined, and then render it alkaline with ammonia.

According to the *Med. Record*, with normal urine the only change which ordinarily occurs is a mere deepening of its color to a sherry or vinegar brown. In conditions of pyrexia other than typhoid fever, the color also deepens, but still remains merely brown, although usually it becomes of a darker tint than the average color given by normal urines. But when the test is applied to the urine of a patient with enteric fever, the color rapidly turns red, the exact tint it acquires varying from the yellowish red of bichromate of potassium solution, through ruby red, to that of a rich port-wine color. On shaking the test tube, a froth is produced which has usually a delicate pink color that is characteristic. On allowing the mixture to stand twenty-four hours, the phosphates precipitated have an *olive-green* tinge.

The *Med. Record* adds that Dr. Howard Taylor, in reporting his experience with this test, evidently is unaware of the importance of this olive-green precipitate.

No. 2,331.—**Reaction between Iodoform and Nitrate of Silver. Caution!** (N. & Co.).

We are informed by our correspondents that, owing to careless packing and unusual jolting during conveyance, two contiguous bottles containing iodoform and nitrate of silver were broken in a box and the contents mixed, as became evident from a brisk escape of suffocating red fumes through the chinks and cracks of the box. The contents packed with the two bottles were utterly ruined, and so were a number of articles which were close to the box. The persons in charge, fearing that the box would take fire, drenched it with water, and the liquid soaking through the bottom of the conveyance corroded all metal parts it came in contact with. Our correspondents have ascertained, what they had been unaware of before, that iodoform and nitrate of silver exert a chemical action upon each other, but wish to have it explained.

The matter is very simple, *except* the explanation of the cause of the reaction or the manner of its beginning.

When iodoform is added to a *solution* of nitrate of silver, under trituration, or, better, if iodoform is gradually triturated with solution of nitrate of silver, there is no violent reaction visible, but the whole of that constituent which is not present in excess is decomposed, after the following reaction (according to Greshoff):

CHI_3	+	$3AgNO_3$	+	H_2O	=	$3AgI$	+	$3HNO_3$	+	CO
iodoform		silver nitrate		water		silver iodide		nitric acid		carbon monoxide

When there is, however, no water present, and the substances come into intimate contact in a *dry* condition, a very violent reaction starts either at once or after a short time. It is not impossible that a trace of moisture at the points where the two substances touch each other induces the reaction in the sense above expressed, though the space over which the reaction, *as such*, can extend must necessarily be very small. But the impetus once given by the minute and probably invisible first reaction, which, moreover, must develop some heat, is most likely the cause of its spreading suddenly, the heat becoming continually greater, and the whole reaction passing off almost like an explosion. In this case, where water is absent, the reaction which takes place is as follows:

CHI_3	+	$3AgNO_3$	=	$3AgI$	+	HNO_3	+	N_2O_4	+	CO_2
iodoform		silver nitrate		silver iodide		nitric acid		nitrogen tetroxide		carbonic acid

The lesson to be learned from the above is, *never* to pack nitrate of silver and iodoform together in one box, so that the contents can become mixed if the bottles break.

Pharmacists are pretty well posted in these days as to explosive or otherwise dangerous combinations, though, of course, the younger generation always has to learn a good deal in this direction. But packers and shippers in wholesale houses need some instruction in this line likewise, else they might be induced sometimes to pack together, near each other, in *one* box, such cheerful companions as a package of chlorate of potassium, a package of saccharated pepsin, and a bottle of sulphuric acid. These combinations could be varied ad libitum, but we hope that every effort will be made to keep them as far apart as possible.

No. 2,332.—**Prescription Difficulty** (J. D. M.).

We are asked the following query:

How would you prepare the following prescription? Why does the phosphoric acid precipitate the quinine after the latter is dissolved in the tincture of iron?

℞ Quininæ Sulphatis	3 2.
Strychninæ Sulphatis	gr. ½.
Ac. Phosphor. Dil.,	
Tr. Ferri Chloridi	ää fl. ℥ ½.
Vin. Pepsini	q. s. ad fl. ℥ 4.

If the quinine salt is dissolved in the phosphoric acid and the tincture then added, the mixture is clear.—

The first query, "Why does the phosphoric acid precipitate the quinine?" starts from the hypothesis that the precipitate *must* be all quinine. But this is not necessarily the case. In fact, we are quite sure that it consists of phosphate of iron as well as of quinine. The sulphate of quinine, having been dissolved in the tincture of iron, has exhausted or neutralized the free acid which the tincture always contains, and the resulting solution is quite concentrated. When dilute phosphoric acid is poured in, the result is that phosphate of iron and also most probably phosphate of quinine (as this salt is less soluble than the sulphate) are formed. Each molecule of precipitate is surrounded by a liquid which becomes capable of dissolving the precipitate only upon addition of more acid. When all the acid is finally added, and the mixture well stirred, solution will eventually take place.

If the quinine salt is dissolved in the phosphoric acid, and the tincture of iron then added, each molecule of precipitate is surrounded, particularly during the first period of the reaction, by a sufficiently acid liquid to cause its immediate resolution.

But whether the solution has been made in one way or another, it is impossible to dilute it, with water, wine, or other similar liquid, without causing the precipitation of a basic quinine (and perhaps also iron) salt. There is a peculiarity of certain quinine salts, among which is the phosphate, that their solutions will not stand dilution unless the proportion of acid is increased or another acid is added.

The trouble with the prescription is that there is not enough free acid available to keep the phosphates which are formed in solution. This can be shown in the following manner:

Mix the phosphoric acid and tincture of chloride of iron, then add enough wine of pepsin to make 3¾ fluidounces, and dissolve the sulphate of strychnine in this. Reduce a *weighed* quantity of sulphate of quinine to powder, transfer a small portion (say 20 grains at first, later less) to a glass mortar, triturate it with a few drops of the liquid to a paste, and gradually add the rest until the quinine is dissolved. Pour the solution into a graduate. Again put some quinine sulphate in the mortar and triturate as before. Continue this until the last portion is seen to dissolve with difficulty. It will thus be found that only about 1½ drachms (instead of 2) will be able to form a permanently clear mixture. And if the whole of the sulphate of quinine is to be added, it will require the addition of a small quantity of dilute hydrochloric acid (about 10 to 15 minims) to produce complete solution. This need not be expected at once, but the mixture may be set aside after the addition of about 10 minims and stirring. If not clear in five minutes, a little more acid may be added.

No. 2,333.—**Volumetric Sulphuric Acid.**

Normal volumetric solution of sulphuric acid is of such a strength that one liter or 1,000 cubic centimeters of it contain exactly half a molecule of the so-called monohydrated acid (H_2SO_4; mol. m. 98), that is, 49 grammes. The exact strength is standardized upon a basis which is known to be obtainable of a uniform strength and pure condition. Such a basis is, for instance, pure bicarbonate of potassium, which is a salt in anhydrous crystals, and is found in commerce exceedingly uniform and quite pure. Or pure crystallized oxalic acid may be chosen as the base. Upon this an alkaline solution may be standardized, and upon the latter then the sulphuric acid.

We now turn to the special point contained in the query of our correspondent, who desires to prepare a stock of normal sulphuric acid, not for general use, but as a standard to be used for occasional control of the volumetric acid prepared in the usual manner. He has found that by deriving a volumetric solution from another, not directly, but through the intervention of one or two others, an exact agreement or correlation is very difficult to reach.

In reply we would say that the difficulty will probably disappear if he will pay attention to the following points (when great accuracy is required):

1. Note carefully the temperature at which your original solutions are made. It is, of course, assumed that all weighings were accurate and no loss incurred. Choose, for making the solutions, such a place, if possible, in which you are afterwards going to use them, and in which great changes of temperature do not occur.

2. Use the solutions at the same, or as nearly as possible at the same, temperature as when they were made. Also prepare and use the solution, upon which they are to be used, at the same temperature.

In many cases, indeed, it is of no great moment whether the temperature varies a little. But when two solutions are to be used together in *one* operation, a disregard of temperature may introduce a material error.

3. Assure yourself of the correctness of your weights and of your burettes. In the case of the latter, at least be sure that, if you use more than one, they agree among each other in calibration. If they do not, allowance must be made. Or try and get along with *one* burette (which is, however, not always practicable).

Now, regarding a method of preparing an exactly correct normal sulphuric acid, there is, of course, only one way, and that is to determine its strength gravimetrically. Yet even here some precautions are necessary to avoid errors. Since a great deal of attention has been paid to this matter by public analysts, for the purpose of introducing uniformity in results, we can do no better than to quote here the method recommended last year by Dr. Wollny to the commission of the German Dairy Union (after *Chem. News*, 1889, 20):

A clean, dry dropping-bottle of about 60 Gm. content, the tip of which is touched with vaseline on the outside, is carefully weighed; 35 to 40 Gm. of normal [or approximately normal] sulphuric acid are then placed in it, and it is again weighed. Afterwards *five* portions of about 3 Gm. each are weighed in beaker glasses of 300 C.c. capacity. The drop-bottle being weighed after each portion, the exact weight of the sulphuric acid each time withdrawn is determined. One hundred C.c. of recently boiled distilled water are added to each of the portions. One hundred C.c. of this distilled water must not require more than 2 drops of [decinormal] barium solution [solution of baryta] to give color after 1 C.c. of phenolphthalein solution [1 in 30] has been added. The series of five samples is now heated in a water-bath to the boiling point, and to each as many C.c. of dilute barium-chloride solution, containing 15 Gm. of the salt in 1 liter, added that for each gramme of normal sulphuric acid there are present 10 C.c. of the barium-chloride solution. [For this reason the sulphuric acid should be as near normal as it is possible to make it by volumetric means.—Ed. Am. Dr.] Afterwards the beakers are covered with watch-glasses and allowed to stand for fifteen minutes over the water-bath. The precipitates are then collected upon *ash-free* filters [Schleicher and Schüll's chemically pure filters, extracted with hydrochloric and hydrofluoric acids] of nine centimeters diameter, and washed with hot distilled water until the chlorine reaction disappears. After drying and incinerating, the weight of sulphate of barium yields by simple calculation the quantity of monohydrated sulphuric acid (H_2SO_4) corresponding to it.

We have given the text of the original somewhat modified in language, but unaltered in facts. But we have taken no account of a second set of samples which are to be tested by titration, since the gravimetric results, if concordant, are all-sufficient.

No. 2,334.—**Pycnometer and Areometer** (X.).

One of our friends recently consulted us regarding the proper use of the term *pycnometer*. Its general application to an instrument for determining specific gravity is, of course, beyond dispute. But some writers use the word pycnometer in the sense of "hydrometer" or "areometer," while others use it as a synonym of "specific-gravity bottle." Dunglison, for instance, says that a pycnometer is an areometer. Now, the term areometer (which should properly be spelled aræometer) was originally applied by Wolf, its inventor, in 1708, to a floating cylinder, such as we more generally call hydrometer. Hence Dunglison believes pycnometer to be a synonym of hydrometer. Without quoting other writers who have used the word in this sense, we may say that we had no difficulty in showing that the large majority of authorities use the word pycnometer distinctively as a synonym of "specific-gravity bottle," and never in the sense of "hydrometer." Moreover, we found that the word "pycnometer" was coined and introduced by Frederking (in 1836) specifically for denoting a thousand-grain specific-gravity bottle, being a bottle having a fine hole bored into it below the neck so as to permit an exact filling. (*Repert. f. d. Pharmacie* [Buchner], vol. 66, p. 73.)

No. 2,335.—**Artificial and Natural Carlsbad Salt** (S.).

The question whether there is any sound legal basis under the claim of the owners or agents of natural Carlsbad salt, that it is protected by proprietary rights, is one which belongs before the courts, and cannot be decided by us offhand.

In reply to another portion of our correspondent's query, as to whether the natural and the artificial salt are equivalent to each other in composition, we can do no better than to quote from the last-issued number of the excellent *Handbuch der praktische Pharmacie*, by Beckurts and Hirsch (8°, Berlin, 1889, vol. II., pg. 407), the chapter (No. 1353) treating of this subject:

"The high price of the so-called natural Carlsbad salt, together with the low commercial value of the soluble salts contained therein, and the facility of imitating it, upon the basis of the existing analyses of the natural water, have for a long time caused the preparation of artificial saline mixtures in place of the natural salt. The employment of these artificial saline mixtures, and the fact of their being preferred to the natural salt, appears so much the more justified as the latter is not at all constant in its composition, and does not correspond, in constituents, to the natural water of the springs.

"The so-called *natural Carlsbad salt* (Sprudel-salt) consists of Glauber's salt (sodium sulphate) with more or less (but always very small quantities) of sodium chloride and carbonate. It differs, therefore, materially from the residue which is obtained by evaporating the natural Carlsbad water, redissolving the residue in water, filtration, and renewed evaporation. [The author designates by 'so-called natural Carlsbad salt' the article prepared at Carlsbad from the natural spring water.—Ed. Am. Dr.] The reason of this difference is that, for the purpose of obtaining a handsomely crystallized salt, the natural water is allowed to *crystallize* during the cold winter, whereby the more difficultly soluble sodium sulphate is principally separated, while chloride and carbonate of sodium remain in the mother-liquid, except a small portion which accompanies the crystallized salt, unless the latter is freed from mother-liquid by washing. More recently a more rationally prepared salt has appeared in the market. This is called 'Karlsbader Quellsalz' (Carlsbad Spring-Salt), and contains the full amount of all constituents of the 'Sprudel' which are soluble in pure water. It is twice as strong as the so-called Sprudel-salt, since it contains no water of crystallization, which in the Sprudel-salt amounts to 56 per cent. To prepare the 'Spring-Salt,' the natural water is raised to a boil, then filtered, and evaporated to dryness. The resulting neutral, saline mass, which contains sodium carbonate, is saturated with carbonic acid gas, whereby the carbonate is converted into bicarbonate. The product has the following composition:

Sodium Bicarbonate	35.95
Lithium Bicarbonate	0.39
Sodium Sulphate	42.05
Potassium Sulphate	3.25
Sodium Chloride	18.16
Sodium Fluoride	0.09
Sodium Borate	0.07
	99.96

"It is a white, granular powder, forming with water an almost clear solution.

"The German Pharmacopœia does not recognize the usual crystalline form of the Sprudel-salt, because the preparation of this is incompatible with a homogeneous product. It gives, therefore, the following formula:

Sodium Sulphate, dry, in fine powder	44 parts.
Potassium Sulphate, in fine powder	2 parts.
Sodium Chloride, in fine powder	18 parts.
Sodium Bicarbonate, in fine powder	36 parts.
	100

which are to be mixed. The mixture is a white, dry powder, containing the soluble constituents of the natural water in nearly the true proportion.

"Following are the mean results of the analysis of the natural water by Berzelius and Ragsky:

	Berzelius.	Ragsky.	Mean, reduced to per cent.
Potassium sulphate	9.331	16.359	2.00
Sodium sulphate, dry	251.094	237.187	46.95
Sodium chloride	103.841	103.067	17.43
Sodium carbonate, dry	131.927	136.189	35.60*
	496.193	492.802	101.98

* This is *bicarbonate*. The corresponding quantity of carbonate would have been 22.462.

"With the figures in the third column the proportions of the German Pharmacopœia agree very well; so also the statement contained in this work, that 6 Gm. of the salt, dissolved in 1 liter of water, furnish a product similar to Carlsbad water."

The Use of Beer Yeast in Medicine.—The use of beer yeast in medicine has chiefly been confined to external applications. But from the account sent home by Dr. Herr from Algiers it would seem to be capable of internal use and with good results. He states that he has employed it with great success for the cure of scurvy. The doses were from one to three grammes for children under three years, from six to eight grammes for adults, to be taken every two hours. He also obtained good results in the treatment of purpura, dysentery, tuberculosis, and particularly in diphtheria.—*Chem. and Drugg.*

Oxygen in Asphyxia.—From April 1st, 1889, Paris fire men will be provided with cylinders of oxygen under pressure, to be used for the prompt relief of persons suffocated during fires. The oxygen will be added to the regular supply of medicines always at hand in case of accidents.—*Chem. and Drugg.*

Cement for Celluloid.—According to the *Neueste Erfindungen und Erfahrungen*, glacial acetic acid may be used for cementing celluloid. The fractured surfaces are to be moistened with it, and then pressed together for some time.